

IN THE CLAIMS

1. **(Currently Amended)** A method of synthesis of a chemical compound ~~of having~~ the formula A-B-C, wherein A is a chemiluminescent moiety comprising a phthalhydrazide, B is an energy acceptor moiety, and C is a biologically active moiety comprising a nucleophilic moiety, the method comprising the steps of either:

(a) (i) attaching a phthalhydrazide precursor to at least one aryl group of a diaryl ethylene to form a phthalhydrazide-precursor-ethylene conjugate;

(ii) condensing two phthalhydrazide-precursor-ethylene conjugates formed in step (a)(i) to form a phthalhydrazide-precursor-pentadiene conjugate;

(iii) converting the phthalhydrazide-precursor of the phthalhydrazide-precursor-pentadiene conjugate formed in step (a)(ii) to phthalhydrazide (A), thereby forming a carrier compound;

(iv) reacting the carrier compound formed in step (a)(iii) with a nucleophilic moiety of the biologically active moiety (C), thereby forming a chemical compound ~~of having~~ the formula A-B-C, wherein A ~~is comprised of~~ phthalhydrazide, B ~~is comprised of~~ pentadiene and C ~~is comprised of~~ a biologically active moiety comprising a nucleophilic moiety; or

(b)(i) condensing two diaryl ethylenes each comprising a leaving group to form a pentadiene;

(ii) protecting the pentadiene formed in step (b)(i) by reaction with a nucleophile;

(iii) exposing the protected pentadiene formed in step (b)(ii) to a phthalhydrazide precursor, thereby displacing the leaving group and forming a protected phthalhydrazide-precursor-pentadiene conjugate;

(iv) converting the phthalhydrazide-precursor of the protected phthalhydrazide-precursor-pentadiene conjugate formed in step (b)(iii) to phthalhydrazide, thereby forming a protected carrier compound;

(v) hydrolyzing the pentadiene protecting group from the protected carrier compound formed in step (b)(iv), thereby forming an unprotected carrier compound; and

(vi) reacting the unprotected carrier compound formed in step (b)(v) with a nucleophilic moiety of the biologically active moiety (C), thereby forming a chemical compound ~~of having~~ the formula A-B-C, wherein A ~~is comprised of~~ phthalhydrazide, B ~~is comprised of~~ pentadiene and C ~~is comprised of~~ a biologically active moiety comprising a nucleophilic moiety.

2. **(Previously Presented)** The method of claim 1 wherein the C moiety is designed for release to a desired biological compartment.

3. **(Previously Presented)** The method of claim 1 wherein the compound is a prodrug.
4. **(Previously Presented)** The method of claim 3 wherein the compound serves as a prodrug for at least one of antiviral agents for the treatment of viral infections and anticancer agents for the treatment of cancers.
5. **(Currently Amended)** The method of claim 4 wherein the compound serves as a prodrug for the treatment of at least one virus selected from the group consisting of the group of viruses comprising Human Immunodeficiency Virus (HIV), herpes viruses such as Herpes Simplex Virus, (HSV), Epstein-Barr Virus (EBV), Varicella Zoster (VZV), Cytomegalovirus (CMV), HSV-6, and HSV-8 (Kaposi's sarcoma), Human Papilloma Virus (HPV), rhinoviruses, and hepatitis-linked viruses.
6. **(Currently Amended)** The method of claim 4 wherein the compound serves as a prodrug for the treatment of at least one cancer selected from the group consisting of the group of cancers comprising colon, breast, lung, renal, retinal, and skin.
7. **(Previously Presented)** The method of claim 3 wherein the prodrugs have increased bioavailability.
8. **(Previously Presented)** The method of claim 2 wherein the compound is a cellular permeant prodrug.
9. **(Previously Presented)** The method of claim 8 wherein intracellular drug release occurs when the prodrug reacts with cellular free radicals via a mechanism involving chemiluminescence, photochromism, and intramolecular energy transfer.
10. **(Previously Presented)** The method of claim 1 wherein the C moiety is a pharmaceutical agent or drug.
11. **(Currently Amended)** The method of claim 10 wherein the pharmaceutical agent is at least one agent selected from the group consisting one of the group of antilipidemic drugs, anticholesterol drugs, contraceptive agents, anticoagulants, anti-inflammatory agents, immunosuppressive drugs, antiarrhythmic agents, antineoplastic drugs, antihypertensive drugs, epinephrine blocking agents, cardiac inotropic drugs, antidepressant drugs, diuretics, antifungal agents, antibacterial drugs, anxiolytic agents, sedatives, muscle relaxants, anticonvulsants, agents

for the treatment of ulcer disease, agents for the treatment of asthma and hypersensitivity reactions, antithroboembolic agents, agents for the treatment of muscular dystrophy, agents to effect a therapeutic abortion, agents for the treatment of anemia, agents to improve allograft survival, agents for the treatment of disorders of purine metabolism, agents for the treatment of ischemic heart disease, agents for the treatment of opiate withdrawal, agents which activate the effects of secondary messenger inositol triphosphate, agents to block spinal reflexes, and antiviral agents including a drug for the treatment of AIDS.

12. **(Previously Presented)** The method of claim 1 wherein the C moiety is released by an oxidation reduction reaction with the target cell's electron carriers or by reaction with free radicals produced as a consequence of electron transport.

13. **(Previously Presented)** The method of claim 12 wherein the C moiety is released into a desired compartment in active form.

14. **(Previously Presented)** The method of claim 13 wherein the released C moiety has a greater therapeutic effect or therapeutic ratio relative to the free C agent alone.

15. **(Previously Presented)** The method of claim 14 wherein the released C moiety has a greater therapeutic effect or therapeutic ratio relative to the free C agent alone as a consequence of at least one of altered pharmacokinetics or pharmacodynamics such as a desirable kinetics of release, a resistance to inactivation or excretion, greater solubility, enhanced absorption, a diminished toxicity, or greater access to the cellular or biological compartment which is the site of action of C.

16. **(Previously Presented)** The method of claim 1 wherein A represents a functionality which undergoes at least one of

- an oxidation reduction reaction where electrons are transferred directly between A and the target cell's electron carriers, and

- a reaction with free radicals of oxygen which are produced as a consequence of electron transport

- such that an excited state is produced in A as a consequence of its participation in one of these reactions.

17. **(Previously Presented)** The method of claim 16 wherein A undergoes intramolecular energy transfer from its own excited state to the B functionality which is an energy acceptor.

18. **(Previously Presented)** The method of claim 17 wherein upon receiving energy from A, B achieves an excited state which relaxes through heterolytic cleavage of the covalent bond of B with C where C is a drug moiety which is released into the environment.

19. **(Previously Presented)** The method of claim 18 wherein the released drug molecule effects a therapeutic functional change by a mechanism which comprises receptor mediated mechanisms including reversible and irreversible competitive agonism or antagonism including a molecule known as a suicide substrate or a transition state analogue mechanism or a noncompetitive or uncompetitive agonism or antagonism or the action is by a nonreceptor mediated mechanism including a "counterfeit incorporation-mechanism".

20. **(Currently Amended)** A method of synthesis of a chemical compound ~~of having~~ the formula A-B-C

where A is a chemiluminescent moiety selected from the group consisting of phthalhydrazides, sulfonyloxamides and active oxalates;

B is an energy acceptor moiety; and

C is a biologically active moiety comprising a nucleophilic moiety;

the method comprising the steps of condensing A and B to form conjugate A-B and reacting the conjugate A-B with C.

21-24. (Cancelled)

25. **(Previously Presented)** The method of claim 20 wherein the energy acceptor moiety B is a photochromic compound.

26. **(Currently Amended)** The method of claim 25 wherein the photochromic compound ~~comprises one which~~ demonstrates photochromic behavior with electromagnetic radiation and bleaching agents.

27. **(Previously Presented)** The method of claim 26 wherein the A functionality is chemiluminescent, and the B functionality is such that the photodissociative drug release spectrum of B overlaps the chemiluminescence spectrum of A.

28. **(Currently Amended)** The method of claim 25 wherein the photochromic compound ~~is~~ is comprises a cationic dye.

29. **(Currently Amended)** The method of claim 28 wherein the cationic dye is at least one dye selected from the group consisting of~~comprises at least one of~~ a diarylmethane dyes, [[and]] triarylmethane dyes, triarylmethane lactones, [[and]] cyclic ether dyes, cationic indoles, pyronines, phthaleins, oxazines, thiazines, acridines, phenazines, and anthocyanidins, and cationic polymethine dyes and azo and diazopolymethines, styryls, cyanines, hemicyanines, dialkylaminopolyenes, and other related dyes.

30. **(Currently Amended)** The method of claim 28 wherein the cationic dye is at least one dye selected from the group consisting of~~comprises at least one of~~

Malachite Green
Helvetia Green
Basic Blue 1
Brilliant Blue
Setoglaurine
Basic Green 1
Brilliant Green
Acid Blue 1
Xylene Blue VS
Patent Blue V
Alphazurine 2G
Acid Blue 3
Brilliant Blue V
Patent Blue V
Food Green 3
FDC Green 3
Acid Green 6
Light Green SF Bluish
Acid Blue 7
Xylene Blue AS
Patent Blue A
Acid Green 3
Acid Blue 9
Erioglaurine

Acid Green 5

Light Green SF Yellowish

Acid Green 9

Erioviridene B

Acid Blue 147

Xylene Cyanol FF

Basic Red 9

Pararosaniline

Basic Violet 14

Fuchsin

Magenta

Basic Fuchsin

Basic Violet 2

New Magenta

Hoffman Violet

Iodine Violet

Basic Violet 1

Methyl Violet

Basic Violet 13

Methyl Violet 6B

Basic Violet 3

Crystal Violet

Gentian Violet

Iodine Green

Basic Blue 8

Victoria Blue 4R

Acid Blue 13

Fast Acid Violet 10B

Acid Blue 75

Eriocyanine A

Methyl Green

Ethyl Green

Basic Violet 4

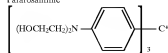
Ethyl Violet

Acid Violet 49

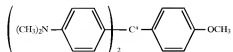
Wool Violet 5BN

Acid Blue 15
Brilliant Milling Blue B
Acid Violet 17
Acid Violet 6B
Wood Violet 4BN
Formyl Violet
Acid Violet 5BS Conc.
Acid Violet 19
Acid Fuchsin
Red Violet 5R
Acid Blue 22
Aniline Blue
Soluble Blue
Solvent Blue 3
Solvent Blue 3
Methyl Blue
Aurin
Mordant Blue 3
Eriochrome Cyanine R
Acid Green 16
Naphthalene Green V
Pontacyl Green NV Extra
Basic Blue 11
Victoria Blue R
Basic Blue 15
Night Blue
Acid Green 50
Wool Green S
Kiton Green S. Conc.
Basic Green 3
Sevron Green B
Brilliant Blue F & R Extra
Brilliant Green Sulfonate
Hexakis (hydroxyethyl)

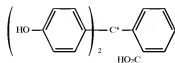
Pararosaniline



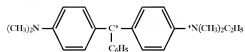
New Green



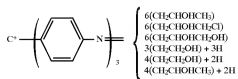
Phenolphthalein



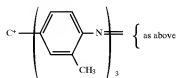
Malachite Green Ethideide



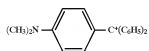
Hydroxyalkylated Pararosanilines



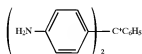
Hydroxyalkylated New Fuchsin



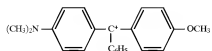
New Yellow



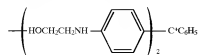
Doebner's Violet



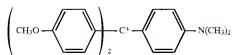
New Red



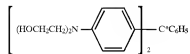
Bis(hydroxyethyl) Doebner's Violet



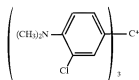
"New Magenta"



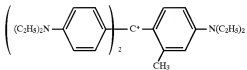
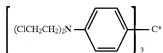
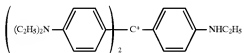
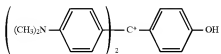
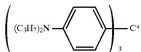
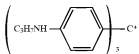
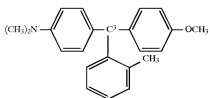
Tetrakis(hydroxyethyl) Doebner's Violet

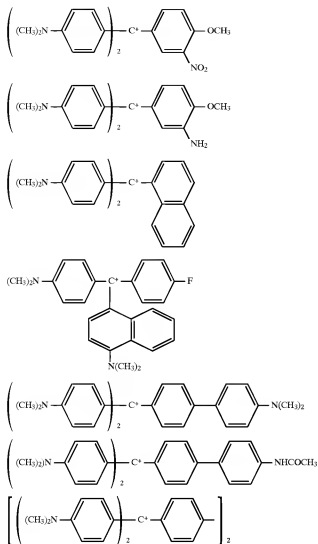


Trichloro Crystal Violet



Slow Red





^a Only the cyanide, bisulfite, and hydroxide ions are considered, regardless of the other anions present in the solution[.].

^b More detailed descriptions of the compositions of photochromic materials tested are given in Macnair's review [255; tables 1A-4][.].

^c Ethanol[.].

^d Diethyl ether[.].

^e 1,2-Dichloroethane[.].

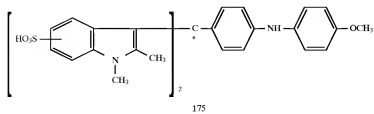
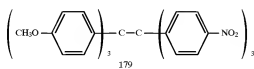
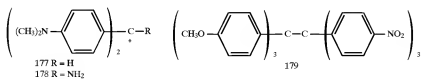
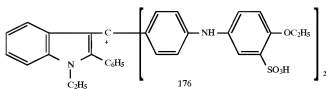
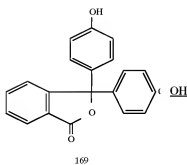
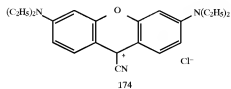
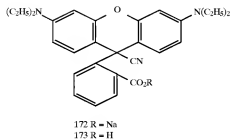
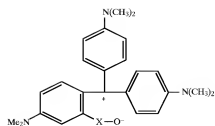
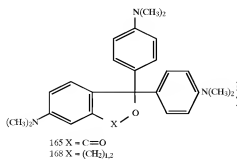
^f 1,1-Dichloroethane, cyclohexane-1,1-dichloroethane, or cyclohexane-1,2-dichloroethane mixtures[.].

^g Benzene[.].

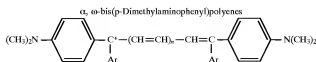
^h Dimethylsulfoxide, neat and aqueous[.].

- ⁱ Acetone[.].]
- ^j Acetic acid[.].]
- ^k Ethyl acetate[.].]
- ^l Ethyl bromide[.].]
- ^m 2-Methoxyethanol[.].]
- ⁿ Chloroform[.].]
- ^o Ethanol with KCN[.].]
- ^p Ethanol with KOH[.].]
- ^q Carboxylic acids-acetic to stearic; hydrocinnamic acid; ethyl and butyl acid phthalates[.].]
- ^r Octadecylnitrile, tributyl phosphate, aniline, 2-(p-tert-butylpheno xy)ethanol, tetraethyleneglycol dimethyl ether, or poly(ethylene glycols)[.].]
- ^s Amides-formamide to stearamide; methylformamide or methylacetamide; dimethyl- or diethyl-formamide or acetamide[.].]
- ^t Three-to-one solutions of cellulose acetate with any of the following five-to-one plasticizer mixtures: butyl stearate, Polyethylene Glycol 600-butyl acetoxystearate, butyl stearate, or Dowanol EP-butyl acetoxystearate[.].]
- ^u Water containing SO₂[.].]
- ^v Water containing bisulfite and papain[.].]
- ^w Poly(vinyl alcohol) with dimethylsulfoxide (5:1)[.].]
- ^x Films, containing residual solvent, cast from the following solutions: ethanol-acetone solutions of vinyl acetate-vinyl alcohol copolymer; aqueous poly(vinyl alcohol); aqueous poly(vinyl pyrrolidone); or aqueous methyl vinyl ether-maleic acid copolymer[.].]
- ^y Methanol-dioxane with aqueous NH₄ HSO₃[.].]
- ^z Paper impregnated with a toluene solution of poly(methyl methacrylate), stearic acid, and 2-(p-tert-butylphenoxy)ethanol, then dried[.].]
- ^{aa} Intracellular impregnation of cellulose with the following swelling agents: n-propylamine, n-butylamine, n-hexylamine, 2-aminoethanol, dimethylformamide, acetic acid, dimethylsulfoxide, methylacetamide, dimethylacetamide, or formamide[.].]
- ^{bb} Films cast from an approximately 4:3 mixture of a 20% solution and cellulose acetate butyrate in toluene-ethyl acetate (1:1) and triallycyanurate in dioxane[.].]
- ^{cc} Films cast from a 2:1 mixture of a 25% solution of cellulose acetate butyrate in toluene-ethyl acetate (1:1) and the titanium esters of N,N,N', N'-tetrakis(2-hydroxypropyl) ethylenediamine[.].]
- ^{dd} Pure water[.].]
- ^{ee} Films cast from aqueous gelatin or other hydrocolloids[.].]
- ^{ff} Dimethylsulfoxide with methanolic KCN[.].]

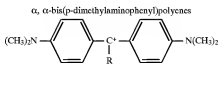
- ^{gg} 2-Methoxyethanol with methanolic KCN[.].]
- ^{hh} Water or aqueous methanol containing bisulfite[.].]
- ⁱⁱ Paper impregnated with m-dimethoxybenzene, acetonitrile, acetic acid, or phenyl methyl carbinol[.].]
- ^{jj} Ethanol-benzene[.].]
- ^{kk} Aqueous ethanol, methanol, aqueous methanol, aqueous acetone, benzene-methanol, carbon tetrachloride-methanol, cyclohexane-methanol, or chloroform-methanol[.].]
- ^{ll} Films cast from 3:1 solutions of cellulose acetate and either Polyethylene Glycol 600 .RTM. or ethylene glycol phenyl ether as plasticizer[.].]
- ^{mm} Films, containing residual solvent, cast from solutions of either cellulose acetate in 2-methoxyethanol or poly(vinyl alcohol) in aqueous ethanol[.].]
- ⁿⁿ Films, containing residual solvent, cast from solutions of either cellulose acetate butyrate in 2-methoxyethanol or poly(vinyl acetate) in methanol[.].]
- ^{oo} Ethanol containing ammonia[.].]
- ^{pp} Aqueous methanol containing $\text{NH}_4 \text{HSO}_3$ and urease[.].]
- ^{qq} Aqueous methanol containing $\text{NH}_4 \text{HSO}_3$, with or without sodium dithionite[.].]
- ^{rr} Aqueous acid at pH 1[.].]
- ^{ss} Aqueous ammonia containing KCN[.].]
- ^{tt} Paper impregnated with aqueous solutions with or without hydrocolloids[.].]
- ^{uu} 2-Methoxyethanol containing HCl[.].]
- ^{vv} Aqueous methanol containing $\text{NH}_4 \text{HSO}_3$, and glucose oxidase[.].]
- ^{ww} 9:1 Methanol-water[.].]
- ^{xx} Aqueous NaOH[.].]



 Photochromic Polymethine Dyes

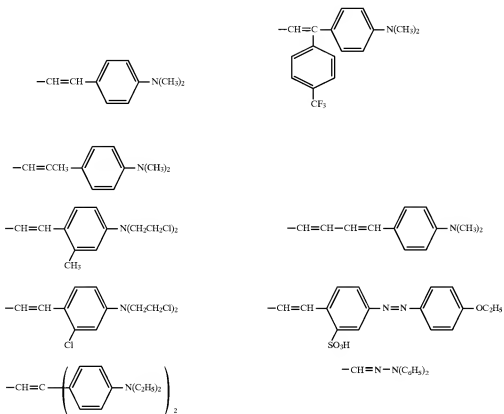


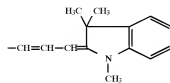
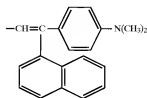
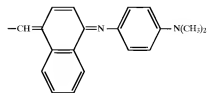
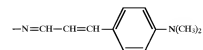
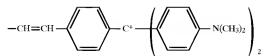
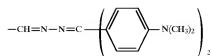
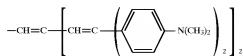
Ar	n
C ₆ H ₅	0, 1, 2
4-(CH ₃) ₂ NC ₆ H ₄	0, 1, 2
4-(CH ₃) ₂ CHC ₆ H ₄	0, 1, 2, 3, 4
4-CH ₃ OC ₆ H ₄	0, 1, 2
4-C ₄ H ₉ OC ₆ H ₄	0, 1, 2
3-CH ₃ C ₆ H ₄	1, 2
4-t-C ₄ H ₉ C ₆ H ₄	1, 2
4-C ₂ H ₅ OC ₆ H ₄	1, 2
4-C ₅ H ₁₁ C ₆ H ₄	1, 2
4-FC ₆ H ₄	1
4-Fsub ₃ CC ₆ H ₄	1
2-(C ₆ H ₅) ₂ NC ₆ H ₄	1
3,4-H ₂ N(OCH ₃)C ₆ H ₃	1
2-Naphthyl	1, 2
4-ClC ₆ H ₄	2
2,4-Cl ₂ C ₆ H ₃	2
1-Naphthyl	2



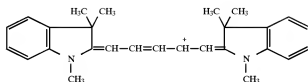
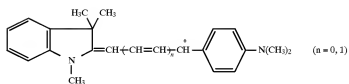
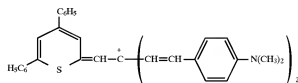
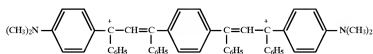
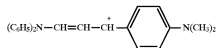
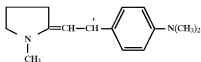
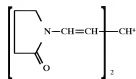
wherein each R ~~is~~^{comprises} a functional group selected from the group consisting of alkyl, cycloalkyl, alkoxy carbonyl, cyano, carbamoyl, heterocyclic rings containing C, O, N, S, sulfo, sulfamoyl, alkoxy sulfonyl, phosphono, hydroxyl, halogen, alkoxy, alkylthio, acyloxy, aryl, alkenyl, aliphatic, acyl, carboxyl, amino, cyanoalkoxy, diazonium, carboxyalkylcarboxamido, alkenylthio, cyanoalkoxycarbonyl, carbamoylalkoxycarbonyl, alkoxy carbonylamino, cyanoalkylamino, alkoxy carbonylalkylamino, sulfoalkylamino, alkylsulfamoylalkylamino, oxido, hydroxy alkyl, carboxy alkylcarbonyloxy, cyanoalkyl, carboxyalkylthio, arylamino,

heteroarylamino, alkoxycarbonyl, alkylcarbonyloxy, cyanoalkoxy, alkoxycarbonylalkoxy, carbamoylalkoxy, carbamoylalkyl carbonyloxy, sulfoalkoxy, nitro, alkoxyaryl, halogenaryl, amino aryl, alkylaminoaryl, tolyl, alkenylaryl, allylaryl, alkenyloxyaryl, allyloxyaryl, cyanoaryl, carbamoylaryl, carboxyaryl, alkoxycarbonylaryl, alkylcarbonyoxyaryl, sulfoaryl, alkoxy sulfoaryl, sulfamoylaryl, and nitroaryl;

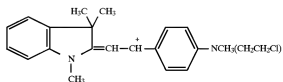




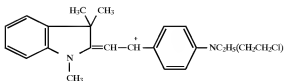
Miscellaneous Polyenes

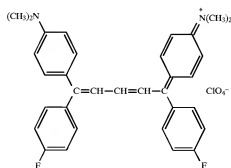
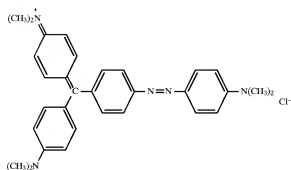
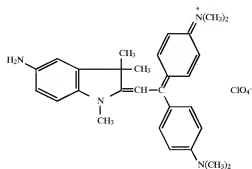
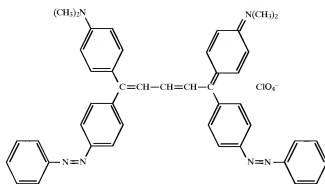


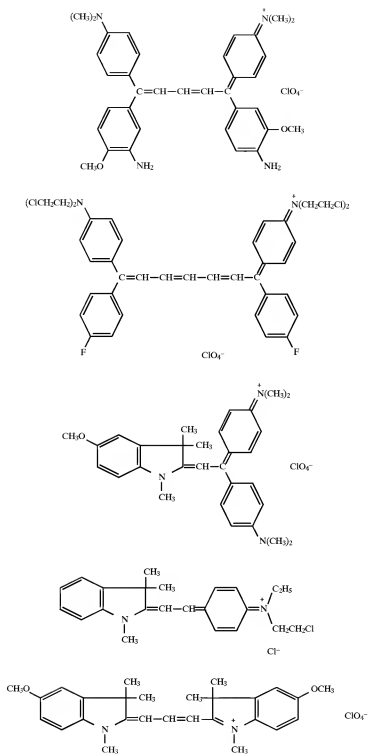
Basic Red 13

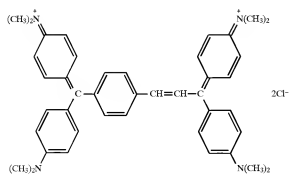
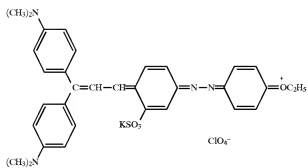
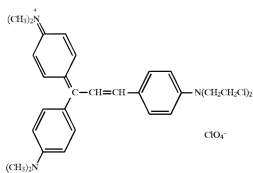
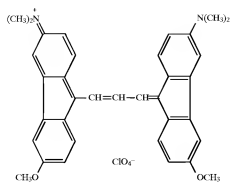


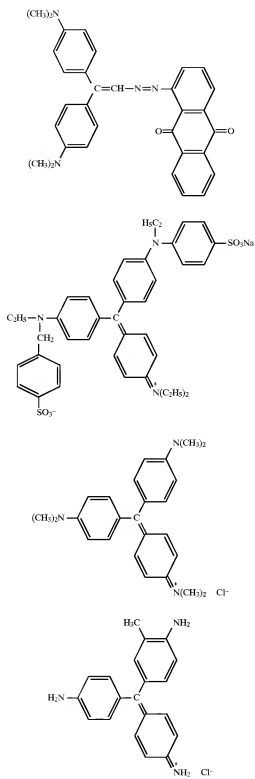
Basic Violet 7

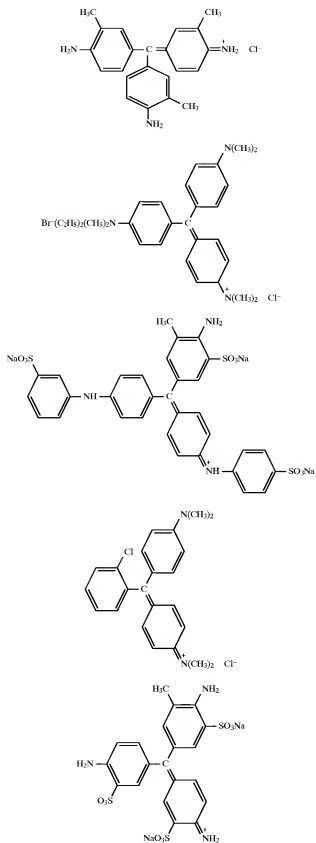
Basic Red 14
Basic Red 15
Basic Violet 15

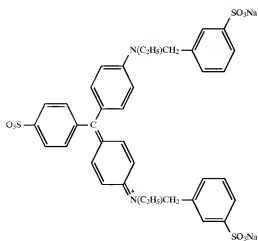
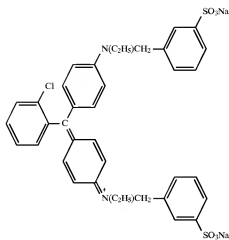
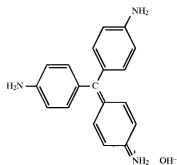
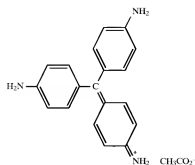


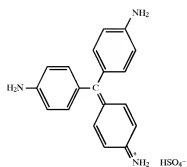
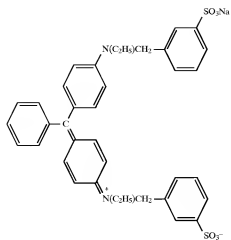






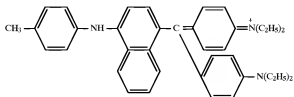




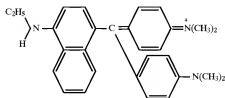


Salt-Isomerism Type Phototropic Dyes

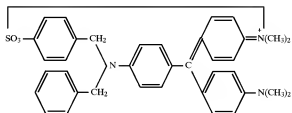
Night Blue



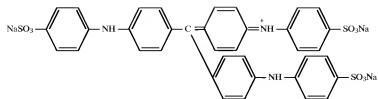
Victoria Blue R



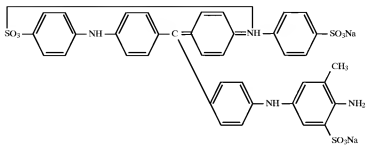
Brilliant Milling Blue B
Brilliant Blue F & R Ex.
Eriocyanine A



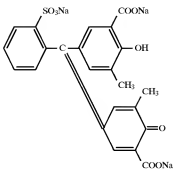
Methyl Blue



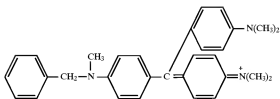
Aniline Blue



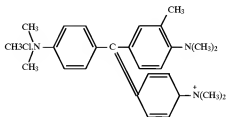
Eriochrome Cyanine R



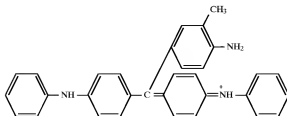
Methyl Violet 6B



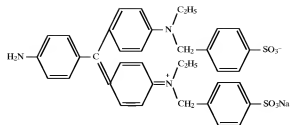
Iodine Green



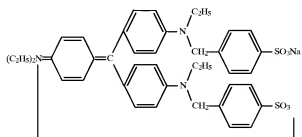
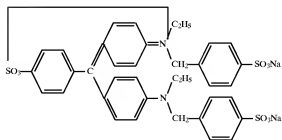
Aniline Blue



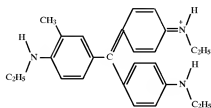
Wool Violet 5 BN



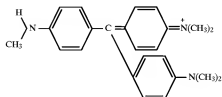
Wool Violet 4 EM

Light Green SF
Yellowish

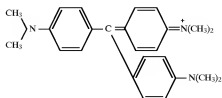
Iodine Violet



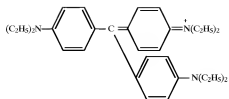
Methyl Violet



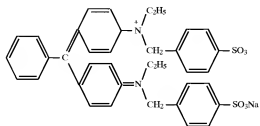
Crystal Violet



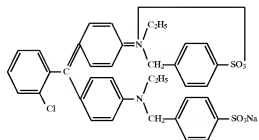
Ethyl Violet



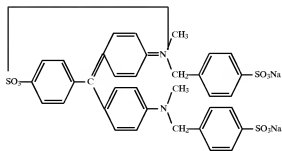
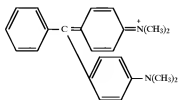
Acid Green I. Extra



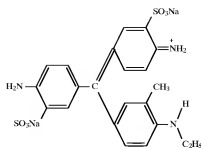
Erioviridine B



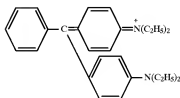
Light Green SF

Victoria Green
(Malachite Green)

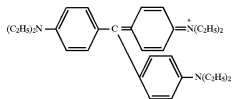
Red-Violet 5R



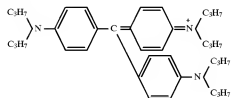
Brilliant Green "B"



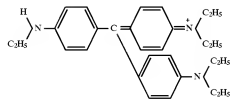
Di-[4(N,N-diethylamino)phenyl][4-(N,N-diethylamino-2-methyl)phenyl] methyl carbonium



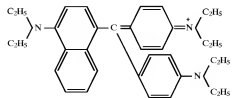
Tri-[4(N,N-dipropylamino)phenyl] methyl carbonium



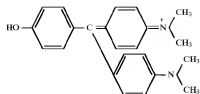
Di-[4(N,N-diethylamino)phenyl][4(ethylamino)-phenyl] methyl carbonium



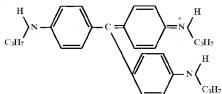
Di-[4(N,N-diethylamino)phenyl][4(N,N-diethylamino)naphthyl] methyl carbonium



Di-[4(N,N-dimethylamino)phenyl]H4(hydroxy)phenyl]
methyl carbonium



Tri-[4(N-propylamino)phenyl] methyl carbonium

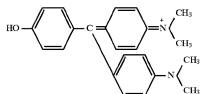


Hectolene Blue DS-1398

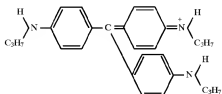
Hectolene Blue DS-1823

Sevron Brilliant Red 4G

Di-[4(N,N-dimethylamino)phenyl]H4(hydroxy)phenyl]
methyl carbonium



Tri-[4(N-propylamino)phenyl] methyl carbonium



Hectolene Blue DS-1398

Hectolene Blue DS-1823

Sevron Brilliant Red 4G

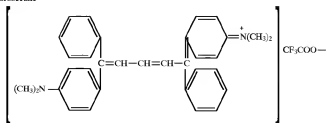
Genacryl Red 6B

Genacryl Pink G

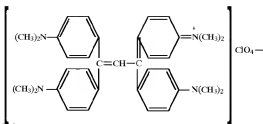
Sevron Brilliant - Red B

Sevron Brilliant - Red 3B

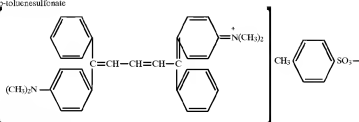
1,5-bis-[4(N,N-dimethylamino)phenyl]-1,5-bis-
(phenyl)divinyl carbonium trifluoroacetate



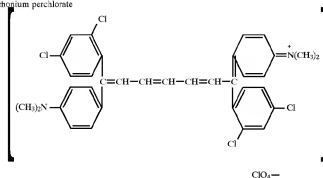
1,1,3,3-tetrakis[4(N,N-dimethylamino)phenyl]
vinyl carbonium perchlorate



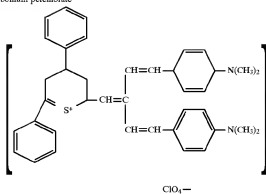
1,5-bis-[4(N,N-dimethylamino)phenyl]-1,5-bis-
(phenyl) divinyl carbonium *p*-toluenesulfonate



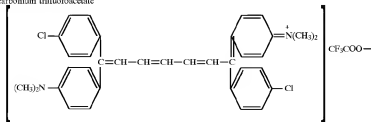
1,7-bis[4(N,N-dimethylamino)phenyl]-1,7-bis-
(2,4-dichlorophenyl) trivinyl carbonium perchlorate



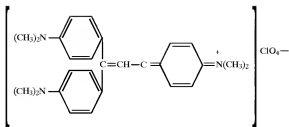
Di-[4(N,N-dimethylamino)phenyl] vinyl[2,4-di-
phenyl-6-methane thiopyran] methyl carbonium perchlorate



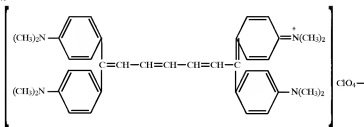
1,7-bis-[4(N,N-dimethylamino)phenyl]-1,7-bis-
(4-chlorophenyl) trivinyl carbonium trifluoroacetate



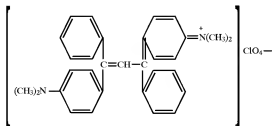
1,1,3-tris-[4-(N,N-dimethylamino)phenyl] divinyl
carbonium perchlorate



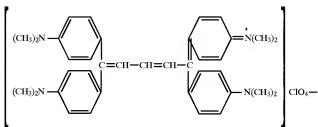
1,1,7,7-tetrakis-[4-(N,N-dimethylamino)phenyl]
trivinyl carbonium perchlorate



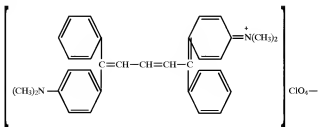
1,3-bis-[4-(N,N-dimethylamino)phenyl]-1,3-bis-
(phenyl) vinyl carbonium perchlorate



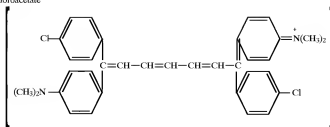
1,1,5,5-tetrakis-[4-(N,N-dimethylamino)phenyl]
divinyl carbonium perchlorate



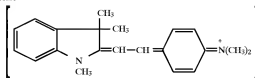
1,5-bis-[4-(N,N-dimethylamino)phenyl]-1,5-bis-
(phenyl) divinyl carbonium perchlorate



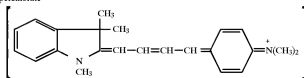
1,7-bis-[4-(N,N-dimethylamino)phenyl]-1,7-bis-(phenyl) trivinyl carbonium trifluoroacetate

CF₃COO—

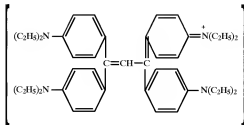
1(1,3,3-trimethyl indoline)-2-[4-(N,N-dimethylamino)phenyl] ethylene carbonium perchlorate

ClO₄—

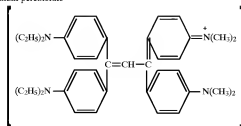
1(1,3,3-trimethyl indoline)-4-[4-(N,N-dimethylamino)phenyl] butylene carbonium perchlorate

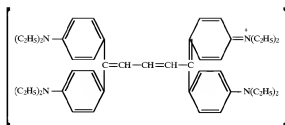
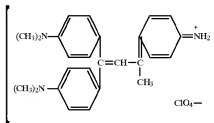
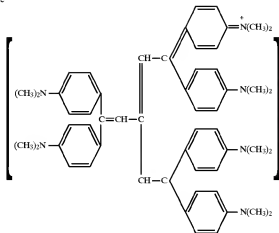
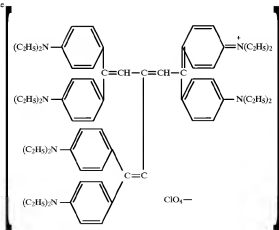
ClO₄—

1,1,3,3-tetrakis-[4(N,N-diethylamino)phenyl] vinyl carbonium perchlorate

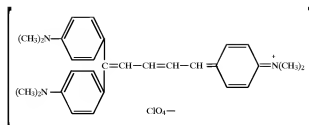
ClO₄—

1,1-bis-[4-(N,N-diethylamino)phenyl]-3,3-bis-[4-(N,N-dimethylamino)phenyl] vinyl carbonium perchlorate

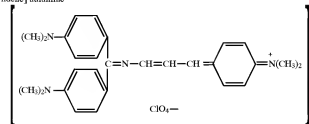
ClO₄—

1,1,5,5-tetrakis[4-(N,N-diethylamino)phenyl]
divinyl carbonium perchlorateClO₄⁻1,1-bis[4-(N,N-dimethylamino)phenyl]-3,4-(amino)
phenyl]-3-methylvinyl carbonium perchlorateClO₄⁻Tri-[1,1-bis-[4-(N,N-dimethylamino)phenyl]
ethylene] methyl carbonium perchlorateClO₄⁻Tri-[1,1-bis-[4-(N,N-diethylamino)phenyl]
ethylene] methyl carbonium perchlorateClO₄⁻

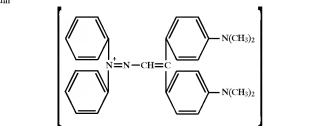
1,1,5-tris-[4-(N,N-dimethylamino)phenyl] divinyl
carbonium perchlorate



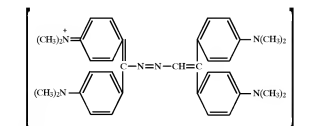
N[4-(N,N-dimethylamino) cinnamylidene] auramine



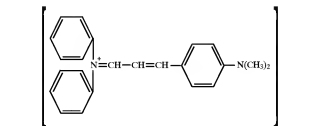
1,1-bis-[4-(N,N-dimethylamino)phenyl]-3,4-bis-
(phenyl)-3,4-diazo butene carbonium



1,1,5,5-tetrakis-[4-(N,N-dimethylamino)phenyl]-
2,3-diazo pentene carbonium

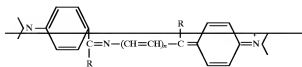


N-(N',N'-dimethylamino cinnamylidene)-N,N-diphenyl
ammonium

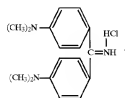


Azo Polymethines

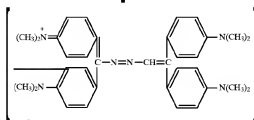
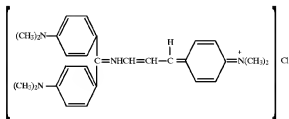
—Dyes of the general structural type—



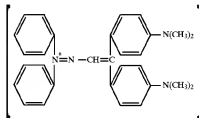
wherein each R comprises a functional group selected from the group consisting of alkyl-, cycloalkyl-, alkoxy-carbonyl-, cyano-, carbamoyl-, heterocyclic rings containing C, O, N, S, sulfo-, sulfamoyl-, alkoxy-sulfonyl-, phosphono-, hydroxyl-, halogen-, alkoxy-, alkylthiol-, acyloxy-, aryl-, alkenyl-, aliphatic-, acyl-, carboxyl-, amino-, cyanoalkoxy-, diazonium-, carboxyalkylcarboxamido-, alkenylthio-, cyanoalkoxy-carbonyl-, carbamoylalkoxy-carbonyl-, alkoxy-carbonylamino-, cyanoalkylamino-, alkoxy-carbonylalkylamino-, sulfoalkylamino-, alkylsulfamoylalkylamino-, oxido-, hydroxy-alkyl-, carboxy-alkylcarbonyloxy-, cyanoalkyl-, carboxyalkylthio-, arylamino-, heteroaryl-amino-, alkoxy-carbonyl-, alkylcarbonyloxy-, cyanoalkoxy-, alkoxy-carbonylalkoxy-, carbamoylalkoxy-, carbamoylalkyl-carbonyloxy-, sulfoalkoxy-, nitro-, alkoxyaryl-, halogenaryl-, amino-aryl-, alkylaminoaryl-, tolyl-, alkenylaryl-, allylaryl-, alkenyloxyaryl-, allyloxyaryl-, cyanoaryl-, carbamoylaryl-, carboxyaryl-, alkoxy-carbonylaryl-, alkylcarbonyloxyaryl-, sulfoaryl-, alkoxy-sulfoaryl-, sulfamoylaryl-, and nitroaryl-, and



Photochromic diazopolymethines



and

1,1',5,5'-tetrakis-[4-(N,N-dimethylamino)phenyl]-
2,3-diazo pentene carbonium1,1'-bis-[4-(N,N-dimethylamino)phenyl]-5,4-bis-
(phenyl)-3,4-diazo butene carbonium

31. (Previously Presented) The method of claim 10 wherein the C moiety is any molecule

which exhibits bleaching behavior with the B moiety and has an increased therapeutic effect or therapeutic ratio as a consequence of its delivery as part of a prodrug.

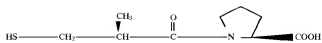
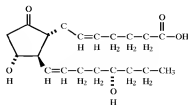
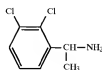
32. **(Previously Presented)** The method of claim 29 wherein the C moiety has a nucleophilic group that bonds to the B moiety.

33. **(Previously Presented)** The method of claim 32 wherein the C moiety is derivatized to have a nucleophilic group that bonds to the B moiety.

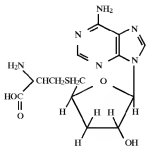
34. **(Currently Amended)** The method of claim 33 wherein the C moiety is derivatized by at least one of the nucleophilic groups ~~comprising~~ selected from the group consisting of cinnamate, sulfite, phosphate, carboxylate, thiol, amide, alkoxide, ~~[[or]]~~ and amine.

35. **(Currently Amended)** The method of claim 10 wherein the C moiety is at least one moiety selected from the group consisting of ~~the group of~~

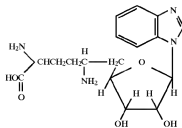
Captopril

Prostaglandin E₂2,3-dichloro- α -methylbenzylamine

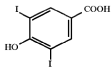
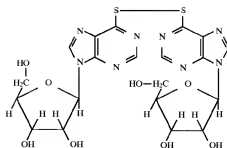
3'-deoxy-8-adenosyl-L-homocysteine



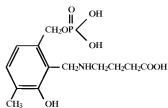
Sinefungin



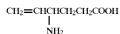
3,5-diiodo-4-hydroxybenzoic acid

6,6'-dithiobis (9 β -B-D-ribofuranosylpurine) γ -aminobutyric acid

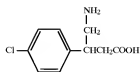
Gabaculine

N-(5'-phosphopyridoxy)-
4-aminobutyric acid

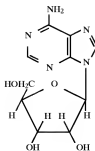
4-amino-hex-5-enoic acid



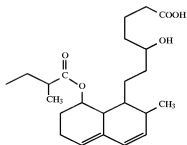
Baclofen



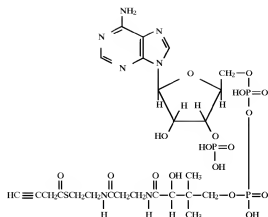
Adenosine

3-hydroxy-3-methyl-
glutamate

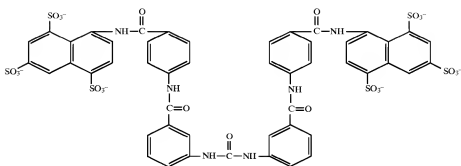
Cumpactin



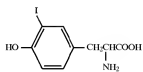
But-3-ynyl-CoA



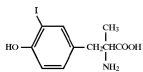
Suramin



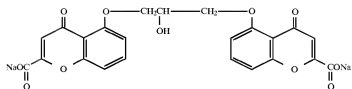
L-3-iodotyrosine



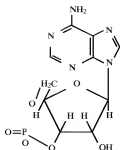
L-3-iodo-α-methyltyrosine



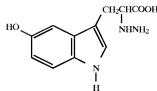
Disodium cromoglycate



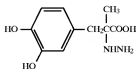
Adenosine
3',5'-cyclic monophosphate



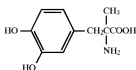
D,L-B-(5-hydroxy-3-indolyl)- α -hydrazinopropionic acid



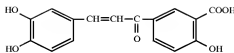
D,L- α -hydrazino- α -methyl dopa



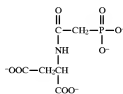
α -methyl dopa



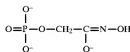
5-(3,4-dihydroxycinnamoyl)salicylic acid



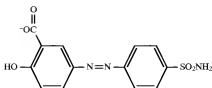
N-(phosphonacetyl)-L-aspartate



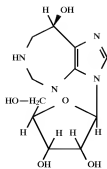
P-glycolohydroxamate



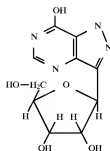
5-(p-sulfamylphenyl)azosalicylic acid



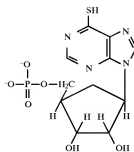
Coformycin



Formycin B



Thioinosinate



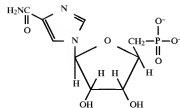
Phosphonoformate



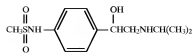
Phosphonoacetate



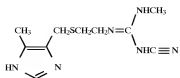
Ridavirin



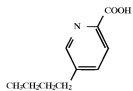
Sotalol



Cimetidine



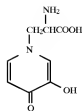
Fuscaric acid



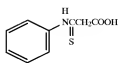
2-mercaptoethylamine



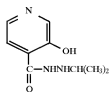
Mimosine



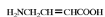
U-7130



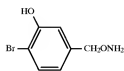
Iproniazid



Trans-4-aminoocrotonic acid



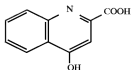
NSD 1055



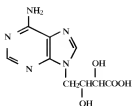
Nicotinic acid



Kynurenic acid



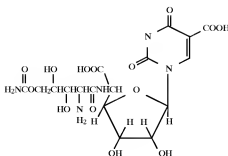
Lentysine



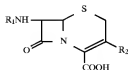
Orotic acid



Polyoxin D

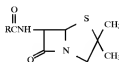


Cephalosporin



, and

Penicillin



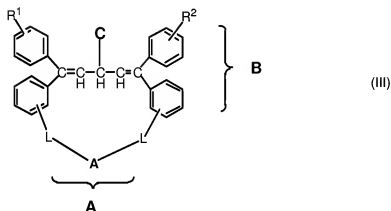
36. (Canceled)

37. (Currently Amended) The method of claim 1 wherein the C moiety is selected from the group consisting of ~~comprises at least one of the group of~~ herbicides, fungicides, miticides, nematocides, fumigants, growth regulators, repellants, defoliants, rodenticides, molluscicides, algicides, desiccants, anthelmintics, and bactericides.

38. (Previously Presented) The method of claim 37 wherein the C moiety is a pesticide.

alkyl, cycloalkyl, alkoxy carbonyl, cyano, carbamoyl, heterocyclic rings containing C, O, N, S, sulfo, sulfamoyl, alkoxy sulfonyl, phosphono, hydroxyl, halogen, alkoxy, alkylthiol, acyloxy, aryl, alkenyl, aliphatic, acyl, carboxyl, amino, cyanoalkoxy, diazonium, carboxyalkylcarboxamido, alkenylthio, cyanoalkoxycarbonyl, carbamoylalkoxycarbonyl, alkoxy carbonylamino, cyanoalkylamino, alkoxy carbonylalkylamino, sulfoalkylamino, alkylsulfamoylalkylamino, oxido, hydroxy alkyl, carboxy alkylcarbonyloxy, cyanoalkyl, carboxyalkylthio, arylamino, heteroarylamino, alkoxy carbonyl, alkylcarbonyloxy, cyanoalkoxy, alkoxy carbonylalkoxy, carbamoylalkoxy, carbamoylalkyl carbonyloxy, sulfoalkoxy, nitro, alkoxyaryl, halogenaryl, amino aryl, alkylaminoaryl, tolyl, alkenylaryl, allylaryl, alkenyloxyaryl, allyloxyaryl, cyanoaryl, carbamoylaryl, carboxyaryl, alkoxy carbonylaryl, alkylcarbonyloxyaryl, sulfoaryl, alkoxy sulfoaryl, sulfamoylaryl, and nitroaryl; and L is a linker.

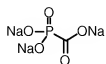
77. **(Currently Amended)** The method of claim 1 wherein A is a sulfonyloxamide or active oxalate and the compound is ofhas the formula



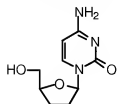
where R^1 , R^2 , and R^3 are functional groups independently selected from the group consisting of alkyl, cycloalkyl, alkoxy carbonyl, cyano, carbamoyl, heterocyclic rings containing C, O, N, S, sulfo, sulfamoyl, alkoxy sulfonyl, phosphono, hydroxyl, halogen, alkoxy, alkylthiol, acyloxy, aryl, alkenyl, aliphatic, acyl, carboxyl, amino, cyanoalkoxy, diazonium, carboxyalkylcarboxamido, alkenylthio, cyanoalkoxycarbonyl, carbamoylalkoxycarbonyl, alkoxy carbonylamino, cyanoalkylamino, alkoxy carbonylalkylamino, sulfoalkylamino, alkylsulfamoylalkylamino, oxido, hydroxy alkyl, carboxy alkylcarbonyloxy, cyanoalkyl, carboxyalkylthio, arylamino, heteroarylamino, alkoxy carbonyl, alkylcarbonyloxy, cyanoalkoxy, alkoxy carbonylalkoxy, carbamoylalkoxy, carbamoylalkyl carbonyloxy, sulfoalkoxy, nitro, alkoxyaryl, halogenaryl, amino aryl, alkylaminoaryl, tolyl, alkenylaryl, allylaryl, alkenyloxyaryl, allyloxyaryl, cyanoaryl, carbamoylaryl, carboxyaryl, alkoxy carbonylaryl, alkylcarbonyloxyaryl, sulfoaryl, alkoxy sulfoaryl, sulfamoylaryl, and nitroaryl; and L is a linker.

78. (Cancelled)

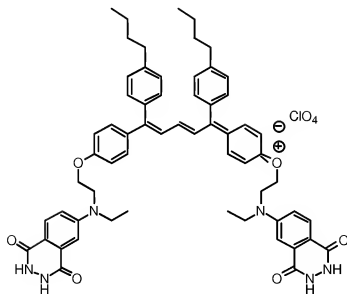
79. **(Currently Amended)** The method of claim 1 wherein C is of~~comprises~~ the formula of at least one of



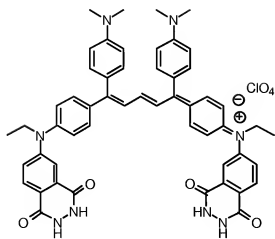
Fosarnet and



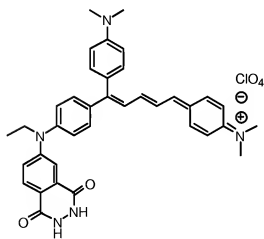
dde , and A-B comprises the formula of at least one of



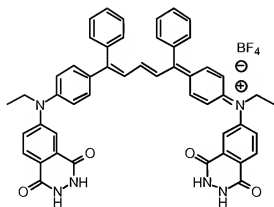
YY99811-1



6a



GZW2-33-1
 $C_{32}H_{38}N_6O_2 \cdot ClO_4$
 M.W. 684.20



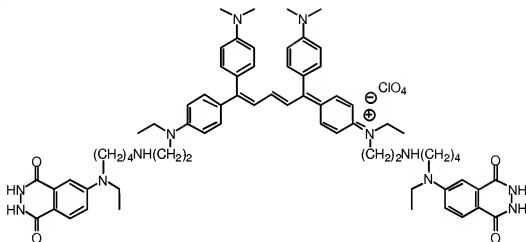
GZW1-98-2

 $C_{30}H_{41}O_4 \cdot BF_4$

M.W.: 864.74

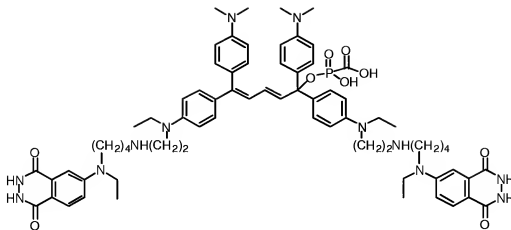
, and

MTLJ-1



80. (Currently Amended) The method of claim 1 wherein the compound is of comprises the formula

MTLJ-1-Foscarnet



81. **(Previously Presented)** The method of claim 1 wherein the hydrolyzable group that protects phthalhydrazide is at least one of acetyl and t-butyloxycarbonyl.

82. **(Previously Presented)** The method of claim 1 wherein the aminophthalimide-substituted precursors for the dye are prepared through amination of an aryl halide such as palladium-catalyzed amination of aryl halides.

83. **(Previously Presented)** The method of claim 1 wherein halo-substituted aryl groups of a starting B moiety or an intermediate are coupled with the aminophthalimide by methods such as the aryl amination under palladium catalysis to form the aminophthalimide-substituted precursors for the dye.

84. **(Previously Presented)** The method of claim 1 wherein halo-substituted aryl groups of a starting phthalimide or an intermediate are coupled with the amino-substituted dye by methods such as the aryl amination under palladium catalysis to form the aminophthalimide-substituted precursors for the dye.

85. **(Previously Presented)** The method of claims 84 wherein the halo-substituted phthalimide is exposed to an imine or a benzophenoneimine, thereby generating an amino substituted aryl group.

86. **(Previously Presented)** The method of claim 1 wherein the aminophthalimide-attached

dye is formed by the condensation of two aminophthalimide-attached ethylene molecules by reaction with triethyl orthoformate and a strong acid such as perchloric acid in acetic anhydride or acetic acid.

87. **(Previously Presented)** The method of claim 1 wherein during the step of converting the phthalimide moiety to the aminophthalhydrazide to obtain A-B, the B moiety is protected from reaction with hydrazine by reacting with base such as sodium hydroxide, sodium methoxide and amines,

88. **(Previously Presented)** The method of claim 87 wherein the phthalimide-B conjugate with a protected B moiety is refluxed with hydrazine in a suitable solvent such as an alcoholic solvent in inert atmosphere and then treated with acid such as perchloric acid, tetrafluoroboric acid to regenerate a corresponding unaltered B moiety of the A-B conjugate.

89. **(Previously Presented)** The method of claim 88 wherein A-B is reacted with one nucleophilic species of C to form A-B-C.

90. **(Currently Amended)** The method of claim 1 wherein A-B is formed, ~~wherein B is a -by starting with B comprising~~ halo-substituted dye[[s]], such as 1,5-bis(p-bromophenyl)-1,5-bis(p-dimethylaminophenyl)-pentadienium perchlorate.

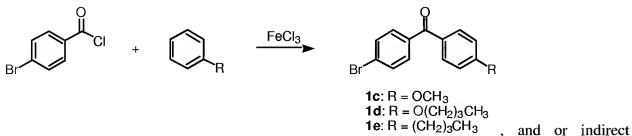
91. **(Previously Presented)** The method of claim 90 wherein cationic dyes are protected by reacting with base such as alkoxide and then coupled with the aminophthalimide by amination of aryl halide such as the palladium-catalyzed amination of aryl halide to obtain the alkoxide-protecting aminophthalimide-substituted dyes.

92. **(Previously Presented)** The method of claim 91 wherein the aminophthalimide-B conjugate with a protected B moiety is refluxed with hydrazine in a suitable solvent such as an alcoholic solvent to convert the amino-phthalimide moiety to the aminophthalhydrazide moiety and then treated with acid to generate A-B.

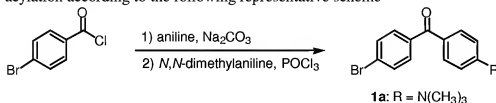
93. **(Currently Amended)** The method of claim 1 wherein [[the]] B ~~is comprises~~ a tetraarylpolymethine, the aminophthalhydrazide precursor is an aminophthalic acid diester and the conjugate to form A-B is amino-phthalimideluminol-tetraaryl-polymethine.

94. **(Previously Presented)** The method of claim 1 wherein halo-substituted diarylketone are

formed by at least one of direct acylation of arene with halo-substituted benzoyl halide under ferric chloride catalysis according to the following representative scheme



acylation according to the following representative scheme



95. **(Previously Presented)** The method of claim 1 wherein a halo-substituted diarylketone is converted to the corresponding halo-substituted diarylketene such as halo-substituted 1,1-diarylethene.

96. **(Previously Presented)** The method of claim 95 wherein the halo-substituted diarylketene is coupled with a precursor of amino-phthalhydrazide such as aminophthalimide, aminophthalic acid diester, by aryl amination such as the palladium-catalyzed amination of aryl halides to form the aminophthalimide-substituted 1,1-diarylethene.

97. **(Previously Presented)** The method of claim 96 wherein the ethene is condensed with an orthoester such as triethylorthoformate in a nonaqueous solvent such as acetic anhydride, containing an acid catalyst such as perchloric acid, tetrafluoroboric acid, to form the aminophthalimide-substituted tetraarylpolymethine dye.

98. **(Previously Presented)** The method of claim 97 wherein the aminophthalimide moiety is converted to the aminophthalhydrazide to obtain A-B.

99. **(Previously Presented)** The method of claim 98 wherein the B moiety is a cationic dye that is first protected by reacting with an anion such as hydroxide, methoxide and amine and the phthalimide-B conjugate with a protected B moiety is refluxed with hydrazine in a suitable

solvent such as an alcoholic solvent in inert atmosphere and then treated with acid such as perchloric acid, tetrafluoroboric acid to regenerate a corresponding unaltered B moiety of the A-B conjugate.

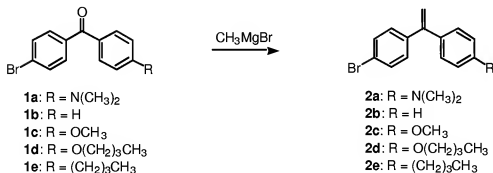
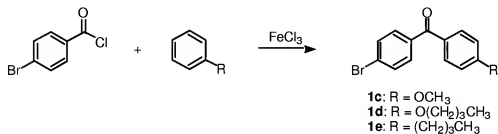
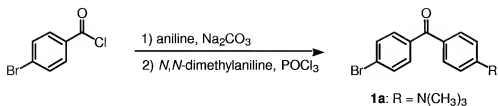
100. **(Currently Amended)** The method of claim 99 wherein A-B is reacted with one nucleophilic species of a C such as a drug 2',3'-dideoxycytidine, Foscarnet, acycloguanosine to form A-B-C ~~comprising a prodrug~~.

101. **(Previously Presented)** The method of claim 95 wherein two halo-substituted diarylketene precursor compounds are condensed with an orthoester such as triethylorthoformate in a nonaqueous solvent such as acetic anhydride containing acid catalyst such as perchloric acid, tetrafluoroboric acid to form the halo-substituted tetraarylpolymethine dyes such as 1,5-bis(p-bromophenyl)-1,5-bis(p-dimethylaminophenyl)-pentadienium perchlorate.

102. **(Previously Presented)** The method of claim 101 wherein the B moiety is a cationic dye that is protected by reacting with an anion such as alkoxide and then coupled with the aminophthalimide by amination of aryl halide such as the palladium-catalyzed amination of aryl halide to obtain the alkoxide-protected aminophthalimide-substituted tetraarylpolymethine dye.

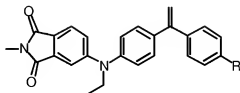
103. **(Currently Amended)** The method of claim 103 wherein the alkoxide-protected aminophthalimide-substituted tetraarylpolymethine dye is refluxed with hydrazine in a suitable solvent such as an alcoholic solvent to convert the amino-phthalimide moiety to the aminophthalhydrazide moiety and then treated with acid to generate A-B, wherein A-B is ~~comprising~~ a luminol-tetraarylpolymethine compound.

104. **(Previously Presented)** The method of claim 1 comprising the general steps given by following representative formula

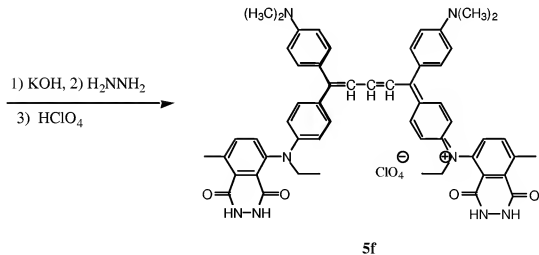
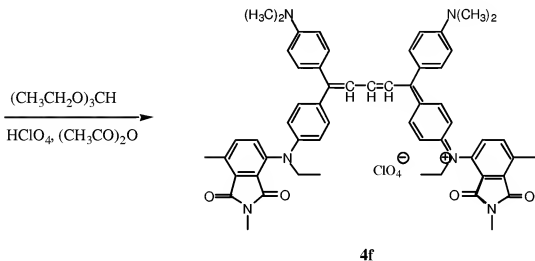
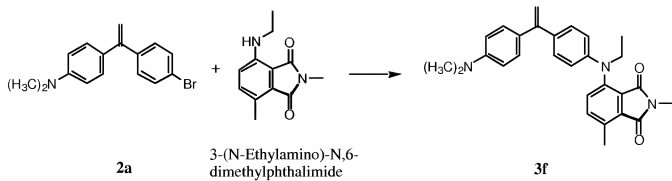


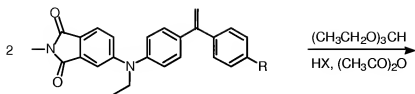
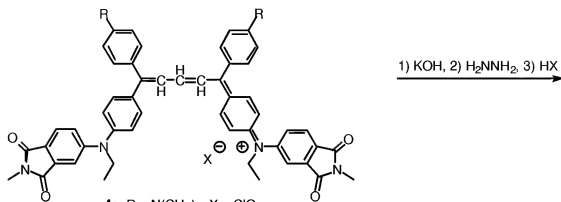
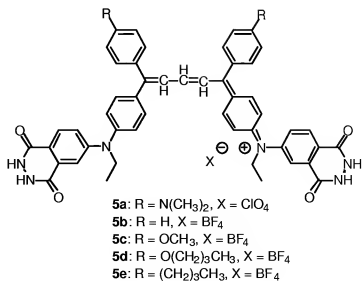
4-(*N*-ethylamino)-*N*-methylphthalimide

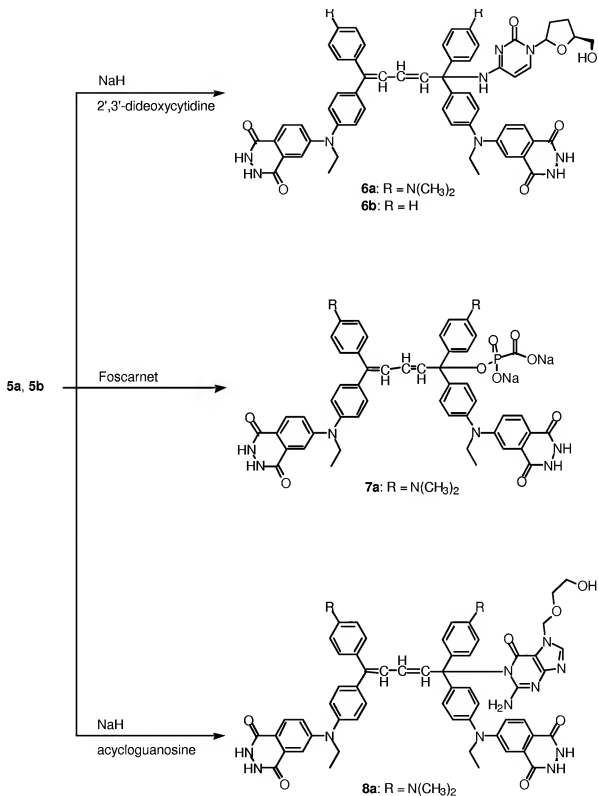
$\text{Pd}(\text{OAc})_2$, $\text{P}(t\text{-Bu})_3$,
 $t\text{-BuONa}$



3a: $\text{R} = \text{N}(\text{CH}_3)_2$
3b: $\text{R} = \text{H}$
3c: $\text{R} = \text{OCH}_3$
3d: $\text{R} = \text{O}(\text{CH}_2)_3\text{CH}_3$
3e: $\text{R} = (\text{CH}_2)_3\text{CH}_3$



**3a:** R = N(CH₃)₂**3b:** R = H**3c:** R = OCH₃**3d:** R = O(CH₂)₃CH₃**3e:** R = (CH₂)₃CH₃**4a:** R = N(CH₃)₂, X = ClO₄**4b:** R = H, X = BF₄**4c:** R = OCH₃, X = BF₄**4d:** R = O(CH₂)₃CH₃, X = BF₄**4e:** R = (CH₂)₃CH₃, X = BF₄**5a:** R = N(CH₃)₂, X = ClO₄**5b:** R = H, X = BF₄**5c:** R = OCH₃, X = BF₄**5d:** R = O(CH₂)₃CH₃, X = BF₄**5e:** R = (CH₂)₃CH₃, X = BF₄



105. (Currently Amended) The method of claim 1 wherein the A functionality ~~is~~ comprises

a phthalhydrazide and the B functionality ~~iscomprises~~ a photochromic dye wherein A is attached to aryl groups of B comprising the steps of

forming a diaryl ketone,

forming a diaryl ketene from the diaryl ketone,

forming a protected aminophthalhydrazide such as aminophthalimide or aminophthalic acid diester,

adding a hydrocarbon linker to the protected aminophthalhydrazide, and

attaching the protected aminophthalhydrazide through the molecular linker to the aryl groups of diarylketene to form the precursor aminophthalimide-linked diarylketene, and reacting according to at least one of

(a) forming the A functionality from the precursor, and condensing two molecules of B precursor linked to A to form A-B, and

(b) condensing two precursor aminophthalimide-linked diarylketene molecules to form A precursor linked to B, and

forming the A functionality from the A precursor to form A-B.

106. **(Currently Amended)** The method of claim 105 wherein the diaryl ketone is formed by a classical Friedel-Crafts acylation between a benzoyl halide and aryl compound with a hydrocarbon linker ~~comprisinghaving~~ a leaving group.

107. **(Currently Amended)** The method of claim 106 wherein the aryl compound with a hydrocarbon linker ~~comprisinghaving~~ a leaving group ~~iscomprises~~ at least one of a halogenated-alkyl-aryl ether and a halogenated-akyl-aryl amine wherein the halogen is the leaving group.

108. **(Currently Amended)** The method of claim 107 wherein the halogenated-alkyl-aryl ether ~~iscomprises~~ 2-bromoethoxybenzene to give an aryl ketone such as 4-(2-bromoethoxy)benzophenone.

109. **(Currently Amended)** The method of claim 107 wherein the halogenated-akyl-aryl amine ~~iscomprises~~ 2-bromoethyl aminobenzene to give an aryl ketone such as 4-(2-bromoethyl amino)benzophenone.

110. **(Previously Presented)** The method of claim 105 wherein the diaryl ketone is converted to the corresponding diarylketene by reacting with a methylating reagent such as a methyl Grignard reagent, methyl lithium reagent, lithium dimethylcopper reagent and then dehydration with acid.

111. **(Previously Presented)** The method of claim 110 wherein the diaryl ketone is converted to the corresponding diarylketene by reacting with methylmagnesium bromide and then dehydration with acid.

112. **(Previously Presented)** The method of claim 105 wherein the diaryl ketone is converted to the corresponding diarylketene by a Wittig reaction.

113. **(Previously Presented)** The method of claim 105 wherein a linker is attached to the protected aminophthalhydrazide by a reaction of a nucleophilic group of the linker or protected aminophthalhydrazide with a leaving group of the linker or protected aminophthalhydrazide.

114. **(Previously Presented)** The method of claim 105 wherein a linker is attached to the protected aminophthalhydrazide by reaction to form a bond between at least one of a nitrogen, oxygen, or carbon atom of the linker and at least one of a nitrogen, oxygen, or carbon atom of group of the protected aminophthalhydrazide by an addition or a substitution reaction of a leaving group.

115. **(Currently Amended)** The method of claim 114 wherein a linker is attached to the protected aminophthalhydrazide by a substitution reaction of at least one of a halogen, tosylate group, or ester group with a nitrogen, oxygen, or carbon atom.

116. **(Previously Presented)** The method of claim 105 wherein attaching the protected aminophthalhydrazide through the molecular linker to one of the aryl groups of diarylketene to form the precursor aminophthalimide-linked diarylketene is by a reaction of a nucleophilic group of the linker or aryl group of diarylketene with a leaving group of the linker or aryl group of diarylketene.

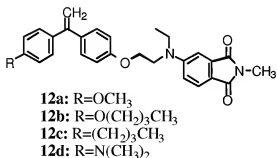
117. **(Previously Presented)** The method of claim 116 wherein a linker is attached to the aryl group of diarylketene by reaction to form a bond between at least one of a nitrogen, oxygen, or carbon atom of the linker and at least one of a nitrogen, oxygen, or carbon atom of group of the protected aminophthalhydrazide by an addition or a substitution reaction of a leaving group.

118. **(Currently Amended)** The method of claim 117 wherein a linker is attached to the aryl group of diarylketene by a substitution reaction of at least one of a halogen, tosylate group, or ester group with a nitrogen, oxygen, or carbon atom.

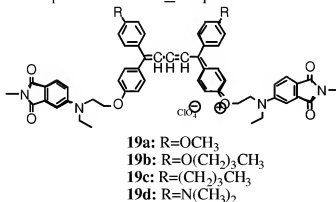
119. **(Previously Presented)** The method of claim 105 wherein the precursor aminophthalimide-linked diarylketene is further reacted by condensation of two aminophthalimide-linked diarylketenes with an orthoester to form B linked to the A precursor.

120. **(Previously Presented)** The method of claim 119 wherein condensing reagent is triethylorthoformate.

121. **(Currently Amended)** The method of claim 119 wherein the precursor aminophthalimide-linked diarylketene ~~is~~comprises at least one of the formula



and the precursor of A-B ~~is~~comprises at least one of the formula



122. **(Previously Presented)** The method of claim 119 wherein the phthalimide moiety of the A precursor is converted to the phthalhydrazide A functionality by treating with hydrazine, forming A-B.

123. **(Previously Presented)** The method of claim 122 wherein the B functionality is protected by reacting with an anion such as hydroxide, methoxide and amine, the A-B precursor is refluxed

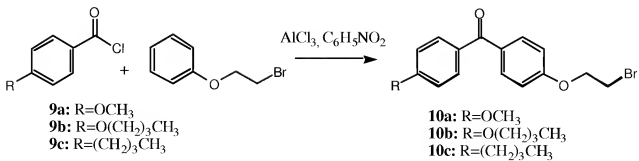
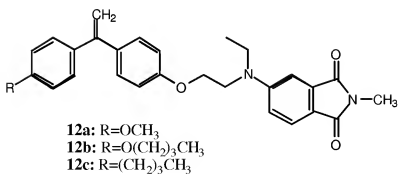
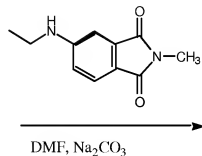
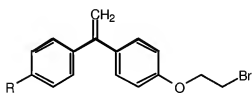
with hydrazine in a suitable solvent such as an alcoholic solvent in inert atmosphere and then treated with acid such as perchloric acid, tetrafluoroboric acid to form A-B.

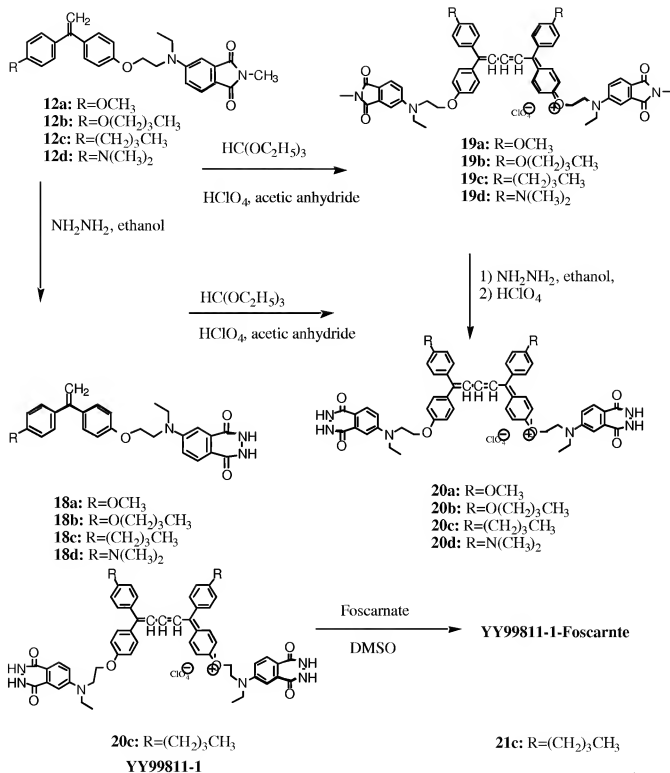
124. **(Previously Presented)** The method of claim 105 wherein the phthalimide moiety of the A precursor of the precursor aminophthalimide-linked diarylketene is converted to the phthalhydrazide A functionality by treating with hydrazine, forming A attached to a B precursor.

125-127. **(Cancelled)**

128. **(Currently Amended)** The method of claim 123 ~~or 125~~ further comprising the step of reacting the B functionality with one nucleophilic species of a C functionality such as Foscamet to form A-B-C.

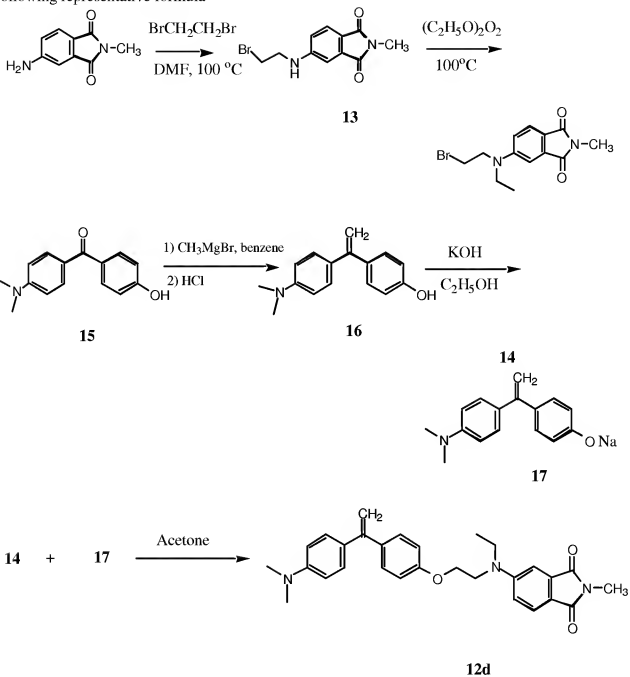
129. **(Previously Presented)** The method of claim 105 comprising the general steps given by following representative formula

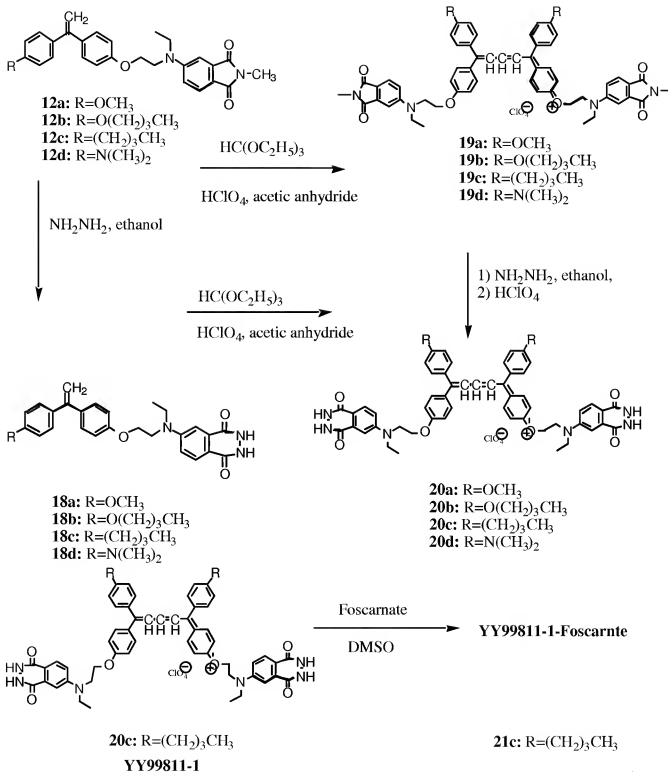
1) CH_3MgBr , benzene2) HCl 



130. (Previously Presented) The method of claim 105 comprising the general steps given by

following representative formula





131. (Currently Amended) The method of claim 1 wherein the A functionality is comprises

a phthalhydrazide and the B functionality ~~is~~comprises a triarylpolymethine photochromic dye wherein A is attached to aryl groups of B comprising the steps of

forming a diaryl ketone,

forming a diaryl ketene from the diaryl ketone,

forming a protected aminophthalhydrazide such as aminophthalimide or aminophthalic acid diester,

adding a hydrocarbon linker to the protected aminophthalhydrazide, and

attaching the protected aminophthalhydrazide through the molecular linker to the aryl groups of diarylketene to form the precursor aminophthalimide-linked diarylketene, and reacting according to at least one of

(a) forming the A functionality from the precursor, and condensing the A-linked diarylketene with an aryl alkene aldehyde to form A-B, and

(b) condensing the precursor aminophthalimide-linked diarylketene with an aryl alkene aldehyde to form A precursor linked to B, and

forming the A functionality from the A precursor to form A-B.

132. **(Currently Amended)** The method of claim 131 wherein the diaryl ketone is formed by a classical Friedel-Crafts acylation between a benzoyl halide and aryl compound with a hydrocarbon linker ~~comprising~~having a leaving group.

133. **(Currently Amended)** The method of claim 132 wherein the aryl compound with a hydrocarbon linker ~~comprising~~having a leaving group ~~is~~comprises at least one of a halogenated-alkyl-aryl ether and a halogenated-alkyl-aryl amine wherein the halogen is the leaving group.

134. **(Currently Amended)** The method of claim 133 wherein the halogenated-alkyl-aryl ether ~~is~~comprises 2-bromoethoxybenzene to give an aryl ketone such as 4-(2-bromoethoxy)benzophenone.

135. **(Currently Amended)** The method of claim 133 wherein the halogenated-alkyl-aryl amine ~~is~~comprises 2-bromoethyl aminobenzene to give an aryl ketone such as 4-(2-bromoethyl amino)benzophenone.

136. **(Previously Presented)** The method of claim 131 wherein the diaryl ketone is converted to the corresponding diarylketene by reacting with a methylating reagent such as a methyl Grignard reagent, methyl lithium reagent, lithium dimethylcopper reagent and then dehydration with acid.

137. **(Previously Presented)** The method of claim 136 wherein the diaryl ketone is converted to the corresponding diarylketene by reacting with methylmagnesium bromide and then dehydration with acid.

138. **(Previously Presented)** The method of claim 131 wherein the diaryl ketone is converted to the corresponding diarylketene by a Wittig reaction.

139. **(Previously Presented)** The method of claim 131 wherein a linker is attached to the protected aminophthalhydrazide by a reaction of a nucleophilic group of the linker or protected aminophthalhydrazide with a leaving group of the linker or protected aminophthalhydrazide.

140. **(Previously Presented)** The method of claim 131 wherein a linker is attached to the protected aminophthalhydrazide by reaction to form a bond between at least one of a nitrogen, oxygen, or carbon atom of the linker and at least one of a nitrogen, oxygen, or carbon atom of group of the protected aminophthalhydrazide by an addition or a substitution reaction of a leaving group.

141. **(Previously Presented)** The method of claim 140 wherein a linker is attached to the protected aminophthalhydrazide by a substitution reaction of at least one of a halogen, tosylate group, ester group with a nitrogen, oxygen, or carbon atom.

142. **(Previously Presented)** The method of claim 131 wherein attaching the protected aminophthalhydrazide through the molecular linker to one of the aryl groups of diarylketene to form the precursor aminophthalimide-linked diarylketene is by a reaction of a nucleophilic group of the linker or aryl group of diarylketene with a leaving group of the linker or aryl group of diarylketene.

143. **(Previously Presented)** The method of claim 142 wherein a linker is attached to the aryl group of diarylketene by reaction to form a bond between at least one of a nitrogen, oxygen, or carbon atom of the linker and at least one of a nitrogen, oxygen, or carbon atom of group of the protected aminophthalhydrazide by an addition or a substitution reaction of a leaving group.

144. **(Previously Presented)** The method of claim 143 wherein a linker is attached to the aryl group of diarylketene by a substitution reaction of at least one of a halogen, tosylate group, ester group with a nitrogen, oxygen, or carbon atom.

145. **(Previously Presented)** The method of claim 131 wherein the precursor aminophthalimide-linked diarylketene is further reacted by condensation with an aryl alkene aldehyde in a nonaqueous solvent, containing an acid catalyst to form B linked to the A precursor.

146. **(Currently Amended)** The method of claim 145 wherein the precursor aminophthalimide-linked diarylketene is an aminophthalimide-substituted 1,1-diarylethene,

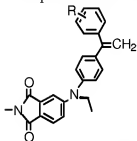
the aryl alkene aldehyde is a p-aminophenyl alkene aldehyde such as p-(dimethylamino)-cinnamaldehyde,

the nonaqueous solvent is acetic anhydride,

the acid catalyst is at least one of perchloric acid and tetrafluoroboric acid, and

the B linked to the A precursor ~~is comprises~~ a aminophthalimide-substituted multiarylpolymethine dye.

147. **(Currently Amended)** The method of claim 145 wherein the precursor aminophthalimide-linked diarylketene ~~is comprises~~ at least one of the formula



3a: R = N(CH₃)₂

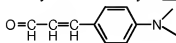
3b: R = H

3c: R = OCH₃

3d: R = O(CH₂)₃CH₃

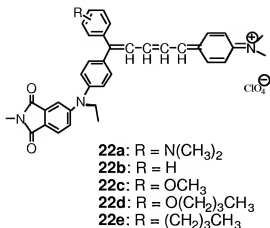
3e: R = (CH₂)₃CH₃

the aryl alkene aldehyde ~~is~~ of has the formula



4-(Dimethylamino)cinnamaldehyde , and

the precursor of A-B ~~is comprises~~ at least one of the formula



148. **(Previously Presented)** The method of claim 145 wherein the phthalimide moiety of the A precursor is converted to the phthalhydrazide A functionality by treating with hydrazine, forming A-B.

149. **(Previously Presented)** The method of claims 148 wherein the B functionality is protected by reacting with an anion such as hydroxide, methoxide and amine, the A-B precursor is refluxed with hydrazine in a suitable solvent such as an alcoholic solvent in inert atmosphere and then treated with acid such as perchloric acid, tetrafluoroboric acid to form A-B.

150. **(Previously Presented)** The method of claim 131 wherein the phthalimide moiety of the A precursor of the precursor aminophthalimide-linked diarylketene is converted to the phthalhydrazide A functionality by treating with hydrazine, forming A attached to a B precursor.

151. **(Previously Presented)** The method of claim 150 wherein the A-linked diarylketene is further reacted by condensation with an aryl alkene aldehyde in a nonaqueous solvent, containing an acid catalyst to form A-B.

152. **(Currently Amended)** The method of claim 151 wherein the A-linked diarylketene is an aminophthalhydrazide-substituted 1,1-diarylethene,

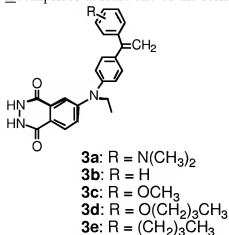
the aryl alkene aldehyde is a p-aminophenyl alkene aldehyde such as p-(dimethylamino)-cinnamaldehyde,

the nonaqueous solvent is acetic anhydride,

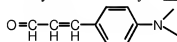
the acid catalyst is at least one of perchloric acid and tetrafluoroboric acid, and

A-B ~~is~~ comprises an aminophthalhydrazide-substituted multiarylpolymethine dye.

153. **(Currently Amended)** The method of claim 152 wherein the A-linked diarylketene ~~is~~comprises at least one of the formula

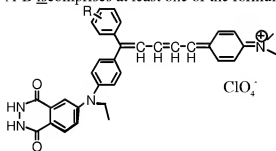


the aryl alkene aldehyde ~~is of~~has the formula



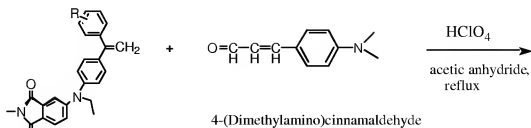
4-(Dimethylamino)cinnamaldehyde, and

A-B ~~is~~comprises at least one of the formula

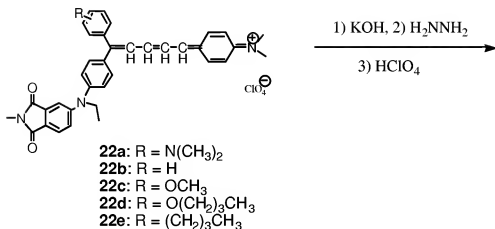


154. **(Previously Presented)** The method of claim 149 or 151 further comprising the step of reacting the B functionality with one nucleophilic species of a C functionality such as Foscamet to form A-B-C.

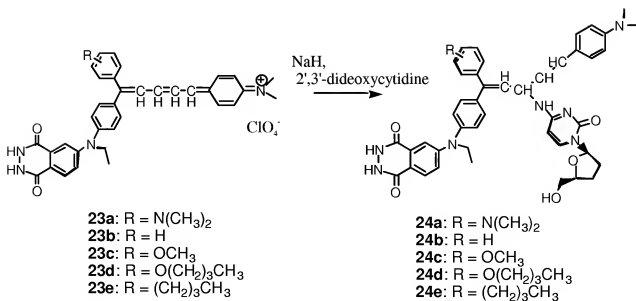
155. **(Previously Presented)** The method of claim 131 comprising the general steps given by following representative formula



- 3a:** R = N(CH₃)₂
3b: R = H
3c: R = OCH₃
3d: R = O(CH₂)₃CH₃
3e: R = (CH₂)₃CH₃

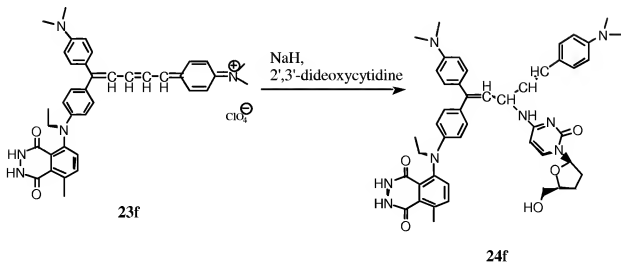
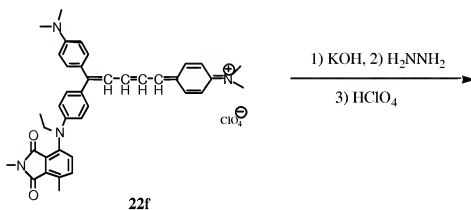
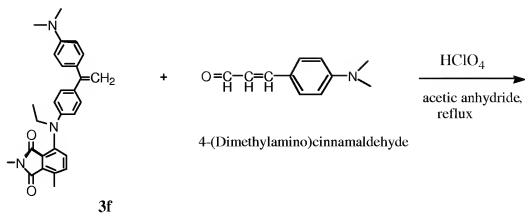


- 22a:** R = N(CH₃)₂
22b: R = H
22c: R = OCH₃
22d: R = O(CH₂)₃CH₃
22e: R = (CH₂)₃CH₃



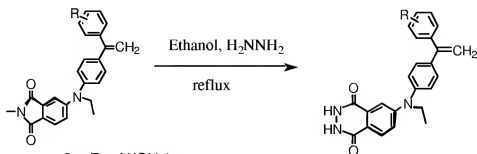
- 23a:** R = N(CH₃)₂
23b: R = H
23c: R = OCH₃
23d: R = O(CH₂)₃CH₃
23e: R = (CH₂)₃CH₃

- 24a:** R = N(CH₃)₂
24b: R = H
24c: R = OCH₃
24d: R = O(CH₂)₃CH₃
24e: R = (CH₂)₃CH₃

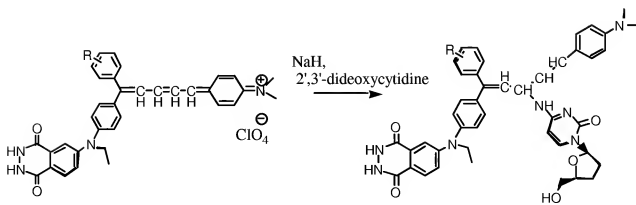
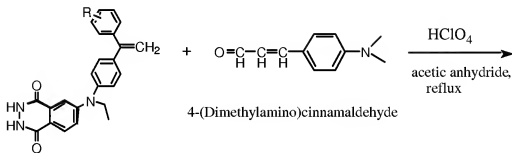


156. (Previously Presented) The method of claim 131 comprising the general steps given by

following representative formula

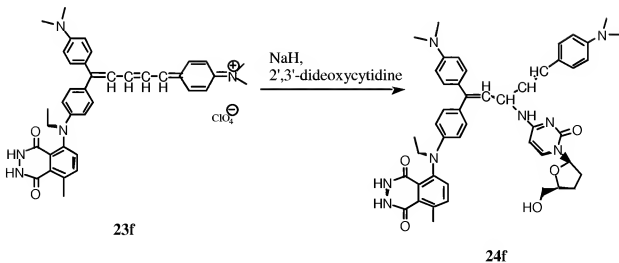
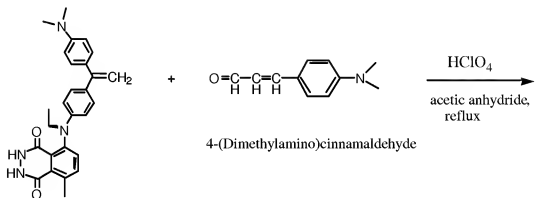
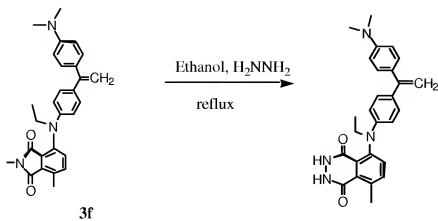


- 3a:** $\text{R} = \text{N}(\text{CH}_3)_2$
3b: $\text{R} = \text{H}$
3c: $\text{R} = \text{OCH}_3$
3d: $\text{R} = \text{O}(\text{CH}_2)_3\text{CH}_3$
3e: $\text{R} = (\text{CH}_2)_3\text{CH}_3$



- 23a:** $\text{R} = \text{N}(\text{CH}_3)_2$
23b: $\text{R} = \text{H}$
23c: $\text{R} = \text{OCH}_3$
23d: $\text{R} = \text{O}(\text{CH}_2)_3\text{CH}_3$
23e: $\text{R} = (\text{CH}_2)_3\text{CH}_3$

- 24a:** $\text{R} = \text{N}(\text{CH}_3)_2$
24b: $\text{R} = \text{H}$
24c: $\text{R} = \text{OCH}_3$
24d: $\text{R} = \text{O}(\text{CH}_2)_3\text{CH}_3$
24e: $\text{R} = (\text{CH}_2)_3\text{CH}_3$



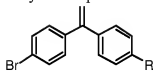
157. (Currently Amended) The method of claim 1 wherein the A functionality is comprises a

phthalhydrazide and the B functionality ~~is~~^{comprises} a triarylpolymethine photochromic dye wherein A is attached to aryl groups of B comprising the steps of

- forming a diaryl ketone,
- forming a diaryl ketene from the diaryl ketone,
- condensing the diarylketene with an aryl alkene aldehyde to form B
- forming a protected ~~aminophthalhydrazide~~^{aminophthalimide} ~~such as aminophthalimide or aminophthalic acid diester,~~
- adding a hydrocarbon linker to the protected ~~aminophthalimide~~^{aminophthalhydrazide},
- and
- attaching the protected ~~aminophthalimide~~^{aminophthalhydrazide} through the molecular linker to the aryl groups of B to form the precursor aminophthalimide-linked B, and
- forming the A functionality from the precursor to form A-B.

158. **(Previously Presented)** The method of claim 157 wherein at least one of the diaryl ketone and diarylketene is halo-substituted and the protected aminophthalhydrazide is attached through the linker by an amination reaction.

159. **(Currently Amended)** The method of claim 158 wherein the halo-substituted diarylketene precursor compound[[s]] ~~is~~^{comprises} the formula of at least one of



2a: R = N(CH₃)₂

2b: R = H

2c: R = OCH₃

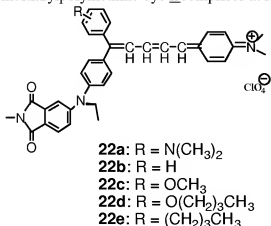
2d: R = O(CH₂)₃CH₃

2e: R = (CH₂)₃CH₃ , and

the halo-substituted multiarylpolymethine dyes, such as 1-(p-bromophenyl)-1,5-bis(p-dimethylaminophenyl)-pentadienium perchlorate, ~~are be prepared by condensation with a p-aminophenyl alkene aldehyde such as p-(dimethylamino)cinnamaldehyde.~~

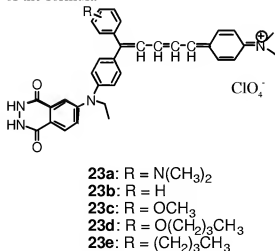
160. **(Previously Presented)** The method of claim 158 wherein B is protected by reacting with an anion such as alkoxide and then coupled with A by amination of aryl halide such as the palladium-catalyzed amination of aryl halide to obtain the alkoxide-protected aminophthalimide-substituted multiarylpolymethine dye.

161. **(Currently Amended)** The method of claim 160 wherein the protected aminophthalhydrazide- linked to B from the alkoxide-protected aminophthalimide-substituted multiarylpolymethine dye is comprises at least one of the formula



162. **(Previously Presented)** The method of claim 160 wherein the alkoxide-protected aminophthalimide-substituted multiarylpolymethine dye is refluxed with hydrazine in a suitable solvent such as an alcoholic solvent to convert the amino-phthalimide moiety to the aminophthalhydrazide moiety and then treated with acid to generate A-B.

163. **(Currently Amended)** The method of claim 162 wherein A-B is comprises at least one of the formula



164. **(Previously Presented)** The method of claim 162 further comprising the step of reacting the B functionality with one nucleophilic species of a C functionality such as Foscamet to form A-B-C.

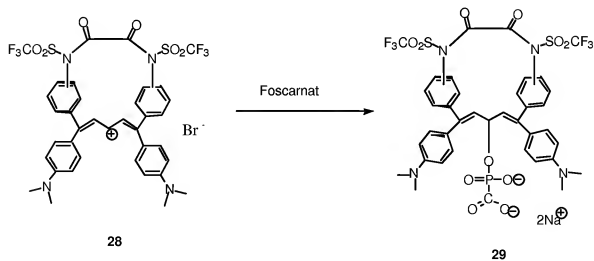
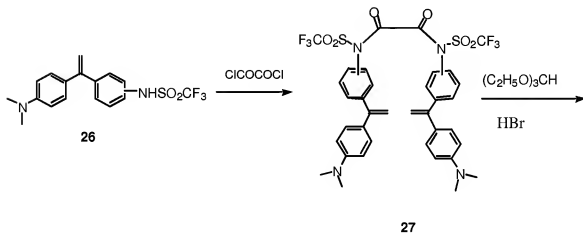
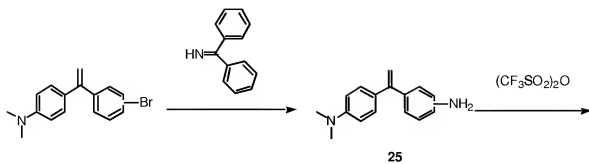
165. **(Previously Presented)** The method of claim 157 wherein at least one of the diaryl ketone and diarylketene is halo-substituted and an aminophthalhydrazide is attached through the linker by an amination reaction.

166. **(Previously Presented)** The method claim 20,
wherein A is a chemiluminescent moiety comprising an active oxalate; and
B is an energy acceptor moiety comprising a multiarylpolymethine photochromic dye.

167. **(Currently Amended)** The method of claim 20,
wherein ~~the~~ A is a chemiluminescent moiety comprising a cyclized active oxalate; and
B is an energy acceptor moiety comprising a multiarylpolymethine photochromic dye.

168-171. **(Cancelled)**

172. **(Previously Presented)** The method of claim 167, comprising the following steps



173. (Currently Amended) The method of claim 20 wherein the chemiluminescent moiety

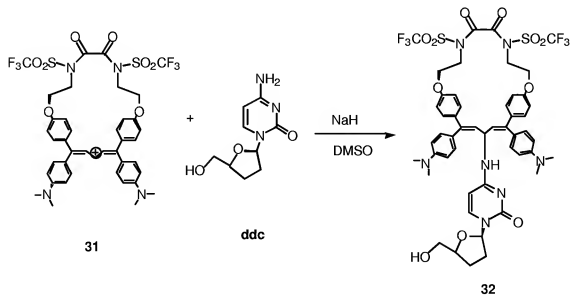
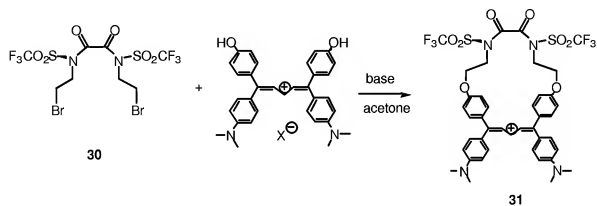
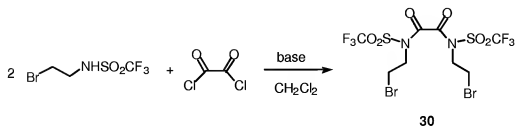
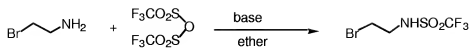
A comprises an active oxalate and the energy acceptor moiety B ~~is~~comprises a multiarylpolymethine photochromic dye wherein the chemiluminescent moiety A is attached to aryl groups of the energy acceptor moiety B through a molecular linker comprising the steps of
forming B, ~~wherein B is comprising~~ a functionalized tetraarylpolymethine dye,
reacting a substituted amine with a sulfonyl anhydride to form a substituted alkyl sulfonamide,
reacting the substituted alkyl sulfonamide with an oxalyl chloride to form a substituted oxamide,
reacting the substituted oxamide with the functionalized tetraarylpolymethine dye to form A-B, ~~wherein A-B is comprising~~ a cyclized oxamido-tetraarylpolymethine.

174. **(Previously Presented)** The method of claim 173 wherein the substituted amine is N-2-bromoethylsulfamide.

175-179. (Cancelled)

180. **(Previously Presented)** The method of claim 173 further comprising the step of reacting the B functionality with one nucleophilic species of a C functionality such as Foscamet to form A-B-C.

181. **(Previously Presented)** The method of claim 173 comprising the general steps given by following representative formula



Claims 182-227 (Cancelled)

228. **(Currently Amended)** The method of claim 10 wherein the C moiety is at least one of one of the group of

- prostaglandins,
- prostaglandin A, A₁, A₂, B, B₁, E, E₁, E₂, F, or F₁, 15(S)-15-methyl PGE 2 methylester, 16,16-dimethyl PGE2, AY-22,093, AY22,469, AY-22,443, or 15(R)-15-methyl PGE2,
- 2'-isopropyl-4'-(trimethylammonium chloride)-5'-methylphenyl piperidine -1-carboxylate (Amo 1618), adenosine cyclic 3', 5'-monophosphate,
- 4'-sulfamylphenyl,
- 2-azobenzene-7-acetamid-1-hydroxynaphthalene-3,6-disulfonate (Neoprontosil), 4'-sulfamyl-2,4-diaminoazobenzene (Prontosil), or 5-(p-sulfamylphenylazo) salicylic acid (Lutazol),
- phosphoglycolohydroxamate which inhibits Class II aldolases present in bacterial and fungi and is noninhibitory of Class I aldolases present in animals,
- inosine or formycin B,
- phosphonoformate (Foscarnet),
- [[□]]γ-amino-butyric acid (GABA),
- gabaculine, N-(5'-phosphopyridoxyl)-4-aminobutyric acid, ethanolamine-o-sulfate, [[□]]γ-vinyl GABA, or [[□]]γ-acetylenic GABA,
- Baclofen or a compound that inhibits GABA release,
- an oligonucleotide which binds to RNA or DNA and blocks transcription or translation of HIV or P-glycoprotein gene products adenosine which binds to brain purinergic receptors to suppress opiate withdrawal,
- adenosine which causes coronary vasodilatation,
- 3-hydroxy-3-methylglutarate, 3-hydroxybutyrate, 3-hydroxy-3-methylpentanoate, 4-bromocrotonyl-CoA, but-3-ynoyl-CoA, pent-3-ynoyl-CoA, dec-3-ynoyl-CoA, ML-236A, ML-236B (compactin), ML-236C, mevinolin, mevinolinic acid,
- thioinosinate which suppresses T lymphocytes,
- Suramin, which is a powerful inhibitor of energy driven calcium uptake by the sarcoplasmic reticulum and is an intracellular inhibitor of Na⁺ K⁺ ATPase where both activities increase intracellular calcium concentrations with a concomitant inotropic effect,
- norepinephrine N-methyltransferase inhibitor such as 2,3-dichloro-[[□]]g-methylbenzylamine, 2,3-dichlorobenzylamine, 2,3-dichlorobenzamidine, or 3,4-dichlorophenylacetamidine,
- adenosine cyclic 3', 5'-monophosphate,
- an inhibitor of dihydroxyphenylalanine decarboxylase during the synthesis of epinephrine

and norepinephrine such as psitectorigenin, genistein, 3', 4', 5,7-tetrahydroxy-8-methylisoflavone, orbol, 8-hydroxygenistein, 3',5,7-trihydroxy-4',6-dimethylisoflavone, 3',5,7-trihydroxy-4',8-dimethoxyisoflavone, D,L-B-(5-hydroxy-3-indolyl)-[[\square]] α -hydrazinopropionic acid, D,L-[[\square]] α -hydrazino-[[\square]] α -methyl-dopa, D,L-B-(3-indolyl), -[[\square]] α -hydrazinopropionic acid, N-methyl-3,4-dopa, [[\square]] α -acetamido-3,4-dimethoxycinnamic acid, DL-[[\square]] α -methyl-3,4-dopa, [[\square]] α -methyl-B-(3-hydroxy-4-methoxyphenyl)alanine, [[\square]] α -methyl-3,4-dimethoxyphenylalanine, or d-catechin; D,L-B-(3-indolyl)-[[\square]] α -methyl-[[\square]] α -hydrazinopropionic acid (R)-3,3,4-dihydroxyphenyl-1-fluoropropylamine, (S)-[[\square]] α -fluoromethyl-dopa, (S)-[[\square]] α -fluoromethyltyrosine, 5-(3,4-dihydroxycinnamoyl) salicylic acid, 3-hydroxycinnamic acid, caffeic acid, 3-mercaptopcinnamic acid, [[\square]] α -methyl-3-hydroxycinnamic acid, [[\square]] α -ethyl-3-hydroxycinnamic acid, 3-hydroxy-w-nitrostyrene, 3,4-dihydroxyhydrocinnamic acid, 3-hydroxybenzalacetone, 3-hydroxychalone, 3-hydroxybenzal furanyl ketone, 3-hydroxybenzal thiophenyl ketone, 3',4'-dihydroxyflavone, 8-O-glucoseflavone, flavone, 3-hydroxyphenyl pyruvic acid, 3,4-dihydroxyphenylpyruvic acid phenylthiopyruvic acid, 4-hydroxyphenylpyruvic acid, dithiosalicylic acid, 1-hydroxy-2-naphthoic acid, 3-hydroxy-7-sulfo-2-naphthoic acid, 3,5-dihydroxy-2-naphthoic acid, 4-chlorocinnamic acid, 2-chlorocinnamic acid, 2,4-dichlorocinnamic acid, 3-nitrocinnamic acid, 3,5-dibromo-2-hydroxycinnamic acid, 2,4,6-triiodo-3-hydroxycinnamic acid, 2-hydroxy-4'-cyanochalone, 4-(4-hydroxycinnamoyl) benzylnitrile, 2-(4-hydroxycinnamoyl)-1,4-dihydroxybenzene, quercetin-6'-sulfonic acid, 5-(2-hydroxy-3,5-dibromocinnamoyl) salicylic acid or 5-(3-hydroxycinnamoyl) salicylic acid,

an inhibitor of acrosin, a proteolytic enzyme located in the acrosome of sperm, such as tosyl lysine chloromethyl ketone, N-[[\square]] α -tosyl-L-arginine chloromethyl ketone, or ethyl p-guanidinobenzoate,

adenosine cyclic 3',5'-monophosphate (cAMP), N⁶, O₂-dibutyryl-adenosine cyclic 3',5'-monophosphate,

adenosine kinase enzyme inhibitor such as 6,6'-dithiobis (9-B-D-ribofuranosyl)purine),

inhibitor of monoamine oxidase such as phenylhydrazine, phenylethylenedihydrazine, isopropylhydrazine, or iproniazid,

an inhibitor of catechol-O-methyltransferase such as 3,5-diiodo-4-hydroxybenzoic acid, S-3'-deoxyadenosyl-L-homocysteine, pyrogallol, R04-4602, gallic acid, 3,5-dihydroxy-4-methylbenzoic acid, 1,3-dihydroxy-2-methoxybenzene, 1-hydroxy-2,3-dimethoxybenzene, 2-hydroxy-1,3-dimethoxybenzene, 1,3-dihydroxy-4-methoxybenzene, catechol, 3,4-dihydroxybenzoic acid, caffeic acid, 5,6-dihydroxyindole, noradrenaline, dopacetamide, H 22/54, quercetin, nordihydroguaiaretic acid, U-0521, arterenone, methylspinalarin, MK 486, dopa, papaveroline, isoprenaline, 7,8-dihydroxy-chlorpromazine, 3-hydroxy-4-pyridone, tetrahydroisoquinoline pyridoxal 5'-phosphate, iodoacetic acid, 3-mercaptopyrrolamine, dehydrocaffeic acid

dilactone, methylspinazorin, 3',5,7-trihydroxy-4',6-dimeth-oxyisoflavone, 3',5,7-trihydroxy-4',8-dimeth-oxyisoflavone, 6,7-dihydromethylspinazarin, S-adenosylhomocysteine, S-tubercidinylhomocysteine, 3',8-dihydroxy-4',6,7-trimethoxyisoflavone, 7-O-methylspinochrome B, 6-(3-hydroxybutyl)-7-O-methylspinachrome B, 3,5-diiodosalicyclic acid, or pyridoxal-5'-phosphate,

an inhibitor of adenosine deaminase which blocks the metabolism of adenosine such as cofomycin, arabinosyl-6-thiopurine, 6-methylthioinosine, 6-thioinosine, 6-thioguanosine, N₁-methyladenosine, N₆-methyladenosine, 2-fluorodeoxyadenosine, 2-fluoroadenosine, inosine, 2'-deoxyinosine, deoxycofomycin, 1,6-dihydro-6-hydroxymethyl purine ribonucleoside, erythro-9-(2-hydroxy-3-nonyl)adenine, or 9-B-D-arabinofuranosyl-6-hydroxylaminopurine,

an inhibitor of adenylate kinase, 5'-nucleotidase, and adenosine translocase such as p¹ p⁵ - diadenosine pentaphosphate, [[□,□]]α,β-methylene adenosine diphosphate, and nitrobenzyl-6-thioinosine, respectively,

an inhibitor of [[□]]γ -aminobutyric acid uptake such as D,L-2,4-diaminobutyric acid, D,L-B-hydroxy GABA, (-)-nipecotic acid, trans-4-aminocrotonic acid, cis-3-aminocyclopentane-1-carboxylic acid, trans-3-aminocyclopentane-1-carboxylic acid, B-guanidinopropionic acid, homohypotaurine, 4-aminopentanoic acid, homotaurine, B-alanine, imidazoleacetic acid, 6-aminohexanoic acid, D,L-carnitine, D,L-2,6-diaminopimetic acid, D,L-2-fluoro GABA, guanidino acetic acid, 2-hydrazinopropionic acid, taurine, D,L-ornithine, or sulphanilamine which potentiates the inhibitory action of GABA,

inositol 1,4,5-triphosphate,

guanosine 5' cyclic monophosphate or 8-bromo guanosine 5' cyclic monophosphate which relaxes smooth muscle,

an inhibitor of the uptake system for glycine, the inhibitory synaptic transmitter of the spinal cord, such as hydrazinoacetic acid,

isoquinoline-sulfonamide inhibitor of protein kinase C, cAMP-dependant protein kinase, or cGMP-dependent protein kinase such as N-(2-aminoethyl)-5-isoquino-linesulfonamide,

Ribavirin which is active against HSV-1 and 2, hepatitis, and influenza viruses, or phosphonoacetic acid which is a highly specific inhibitor of Herpes Simplex virus induced polymerase and is active against HSV-1 and HSV-2, or adenine arabinoside (ara-A), cytosine arabinoside (Ara-C), ara-A 5'-monophosphate (ara-AMP), or hypoxanthine arabinoside (ara-1Ix) which is active against HSV or phagicin which is active against vaccinia and HSV, or 4-fluoroimidazole, 4-fluoroimidazole-5-carboxylic acid, 4-fluoroimidazole-5-carboxamide, 5-fluoro-1-B-D-ribofuranosylimidazole-4-carboxamide, 5-amino-1-B-D-ribofuranosylimidazole-4-carboxamide, poly (I), poly (C), sinefungin, iododeoxyuridine, 9-(2-hydroxy-ethoxymethyl) guanine, gliotoxin, distamycin A, netropsin, congocidine, cordycepin, 1-B-D-

arabinofuranosylthymine, 5,6-di-hydroxy-5-azathymidine, pyrazofurin, toyocamycin, or tunicamycin,

an inhibitor of fungal chitin synthetase such as polyoxin D, nikko-mycin Z, or nikkomycin X,

an impermeant antifungal agent such as ezomycin A₁, A₂, B₁, B₂, C₁, C₂, D₁, or D₂ or platenocidin, septacidin, sinefungin, A9145A, A9145C, or thraustomycin,

an inhibitor of central nervous system carbonic anhydrase such as methazolamide, or 2-benzoylimino-3-methyl-[[□]] Δ^4 -1,3,4-thiadiazoline-5-sulfonamide substituted at the benzoyl group with 3,4,5-trimethoxy, 2,4,6-trimethoxy, 2,4,5-trimethoxy, 4-chloro, 4-bromo, 4-iodo, or hydrogen,

an inhibitor of dopamine- β -hydroxylase during the synthesis of norepinephrine and epinephrine such as fuscic acid, 5-(3',4'-dibromobutyl)picolinic acid, 5-(3'-bromobutyl)picolinic acid, 5-(3',4'-dichlorobutyl)picolinic acid, YP-279, benzyloxyamine, p-hydroxybenzyloxyamine, U-21,179, U-7231, U-6324, U-0228, U-5227, U-10,631, U-10,157, U-1238, U-19,963, U-19,461, U-6628, U-20,757, U-19,440, U-15,957, U-7130, U-14,624, U-22,996, U-15,030, U-19,571, U-18,305, U-17,086, U-7726, dimethyldithiocarbamate, diethyldithiocarbamate, ethyldithiocarbamate, 2-mercaptoethylguanidine, thiophenol, 2-mercaptoethylamine, 3-mercaptoethylguanidine, 3-mercap- toprbpyl-N-methylguanidine, 2-mercaptoethanol, 2-mercaptoethyl-N-methylguanidine, 2-mercaptoethyl-N,N'-dimethylguanidine, 4,4,6-trimethyl-3,4-dihydropyrimidine-2-thiol, N-phenyl-N'-3-(4H-1,2,4-triazolyl)thiourea, methylspinazarin, 6,7-dimethylspinazarin, 7-O-methy-spinochrome B, 6-(3-hydroxybutyl)-7-O-methylspinachrome B, aquayamycin, chrothiomycin, frenoclicin, N-n-butyl-N'-3-(4H-1,2,4-triazolyl) thiourea, propylthiouracil, mimosine, mimosinamine, or mimosinic acid,

an inhibitor of histidine decarboxylation during the synthesis of histamine such as 2 -hydroxy-5-carbomethoxybenzyloxyamine, 4-toluene-sulfonic acid hydrazide, 3-hydroxy benzyloxyamine, hydroxylamine, aminooxyacetic acid, 4bromo-3-hydroxybenzyloxyamine (NSD-1055), rhodanine substituted in the 3 position with p-chlorophenethyl, p-chlorobenzyl, p-methylthiobenzyl, p-methylbenzyl, p-fluorobenzyl, amino, 3,4-dichlorobenzyl, p-bromobenzyl, p-methoxybenzyl, p-bromoanilino, p-iodoanilino, p-chloroanilino, p-toluidino, anilino, 2,5-dichloroanilino, dimethylamino, or p-methoxyphenyl; 2-mercaptobenzimidazole-1,3-dimethylol, 4-bromo-3-hydroxy -benzoic acid, 4-bromo-3-hydroxybenzyl alcohol, 4-bromo-3-hydroxy-hippuric acid, (R,S)-□-fluoromethyl- histidine, (S)- [[□]] Δ -fluoromethylester, L-histidine ethyl ester, L-histidinamide, D,L-3-amino-4-(4-imidazolyl)-2-butanone, 2-bromo-3-hydroxybenzyloxyamine, 5-bromo-3-hydroxybenzyloxyamine, 4,6-dibromo-3-hydroxybenzyloxyamine, aminooxypropionic acid, benzyloxyamine, 4-bromo-3-benzenesulfonyloxybenzyloxyamine, 3',5,7-trihydroxy-4',6-dimethoxyisoflavone, lecanoric acid,

N-(2,4-dihydroxybenzoyl)-4-aminosalicylic acid, or 3',5,7-trihydroxy-4',8-dimethoxyisoflavone,
 a centrally acting converting enzyme inhibitor such as captopril,
 an antibacterial agent such as penicillin, cephalosporin, or cephamycin, with β -lactamase resistance,
 an agent which blocks bacterial synthesis of tetrahydrofolate such as a sulfonamide, sulfanilamide, sulfadiazine, sulfamethoxazole, sulfisoxazole, or sulfacetamide,
 an inhibitor of dihydrofolate reductase including pyrimethamine, cycloguanil, trimethoprin, isooxampterin, 9-oxofolic acid, or isofolic acid,
 a bactericidal agent such as nalidixic acid or oxolinic acid,
 an inhibitor of bacterial protein synthesis such as vancomycin, an aminoglycoside, erythromycin, tetracyclin, or chloramphenicol,
 an inhibitor of viral DNA polymerase such as vidarabine,
 tuberculostatic or tuberculocidal agent such as isoniazid or aminosalicylic acid,
 an anthelmintic agent such as oxamniquine, piperazine, metronidazole, diethylcarbamazine, paromomycin, niclosamide, bithionol, metrifonate, hycanthone, dichlorophen, or niclosamide,
 an H_2 -blocking agent such as cimetidine or ranitidine,
 an agent which blocks release of norepinephrine such as sotalol, guanethidine, pindolol, pronethalol, KO 592, practolol, oxprenolol, or pronethalol,
 a xanthine oxidase inhibitor such as allopurinol, thiouinosinate, 5,7-dihydroxypyrazolo 1,5-pyrimidine substituted at the 3 position with hydrogen, nitro, bromo, chloro, phenyl, 3-pyridyl, p-bromophenyl, p-chlorophenyl, p-acetylanilino, p-tolulyl, m-tolulyl, naphthyl, or 3,4-methylenedioxypheyl;
 8-(m-bromoacetamidobenzylthio)hypoxanthine, 8-(m-bromoacetamidobenzylthio)hypoxanthine, guanine substituted at the 9 position with phenyl, 4-chlorophenyl, 3-chlorophenyl, 3,4-dichlorophenyl, 4-methoxyphenyl, 3,4-dimethoxyphenyl, 4-dimethylaminophenyl, 4-aminophenyl, 3-aminophenyl, 3-trifluoromethylphenyl, 4-benzamido, 4-carboxylphenyl, 4-methylphenyl, 4-ethylphenyl, 3-methylphenyl, B-naphthyl, or 4-ethoxyphenyl;
 4,6-dihydroxypyrazolo 3,4-d pyrimidine, 4-trifluoromethylimidazoles substituted at the 2 position with phenyl, p-chlorophenyl, p-methoxyphenyl, p-acetylanilino, p-nitrophenyl, p-dimethylaminophenyl, p-cyanophenyl, p-fluorophenyl, p-carboxyphenyl, m-chlorophenyl, 3,4-dichlorophenyl, 4-pyridyl, 3-pyridyl, 2-quinolyl, 6-quinolyl, 4-quinolyl, 7-quinolyl, 2-pyrazinyl, or 1-(2-pyridyl)-4-trifluoromethyl-5-bromoimidazolyl; 5-(4-pyridyl)-1,2,4-triazoles substituted at the 5 position with 4-pyridyl, 3-pyridyl, 2-pyridyl, phenyl, p-chlorophenyl, m-chlorophenyl, p-sulfonamidophenyl, 3,5-dichlorophenyl, 3,5-dicarboxyphenyl, 6-quinolyl, 2-furyl, 4-pyridazinyl, 2-thienyl, 2-pyrimidinyl, 4-pyrimidinyl, or 4-pyrazinyl; difunisal, 4(or 5)-(2-aminoethylthio-azo)imidazole-5(or 4)-carboxamide, 4 (or 5)-diazimidazole-5(or 4)-carboxamide, or S-65(or

4)-carbamoyl-4(or 5)-imidazolyl azo cysteine,

an agent which inhibits DNA synthesis such as a bis-thiosemicarbazone, 3,5-diisopropylsalicyl- hydroxamic acid, 4-hydroxybenzoylhydroxamic acid, 3-methylsalicylhydroxamic acid 2,5-dihydroxybenzoylhydroxamic acid, or 2-hydroxy-3,4,5-trimethoxybenzoylhydroxamic acid; or which inhibits nucleotide synthesis such as N-(phosphoacetyl)-L-aspartate which inhibits asparatate transcarbamylase during pyrimidine synthesis, or azaserine or 6-diazo-5-oxo-L-norleucine which inhibits purine synthesis at the phosphoribosyl-formyl-glycinamidase synthetase step; or which is an antifolate such as methotrexate, 2,4-diamino-5-benzyl-6-(4-phenylbutyl) pyrimidine, 2,4-diamino-5-phenyl-6-(4-phenylbutyl) pyrimidine, 2,4-diamino-5-phenyl-6-(3-anilinopropyl) pyrimidine, 2-amino-4-hydroxy-5-phenyl-6-(3-p-aminobenzoylglutamic acid propyl) pyrimidine, N-(p-oo(2,4-diamino-6-quinazolinyl)methyl-methylamino- benzoyl-L-glutamic acid, N-p-2,4-diamino-5-methylquinazolinyl)methylaminobenzoyl-L-aspartic acid, N-p-(2-amino-4-hydroxy-6-quinazolinyl) methyl-methylamino benzoyl-L-glutamic acid, 2,4-diaminoquinazolines: CCNSC 105952, CCNSC 112846, CCNSC 121346, CCNSC 122761, CCNSC 122870, CCNSC 529859, CCNSC 529860, or CCNSC 529861; 8-aza GMP, 7-deaza-8-aza GMP, 2'-dGMP, B-D-arabinosyl GMP, pentopyranine A-G, B-ribofuranosyl-1,3-oxazine-2,4-dione, pyrazofurin, 6-(p-chloroacetyl-anilino-methyl)-5-cetylvinylanilino-methyl)-5-(p-chlorophen yl)-2,4-diaminopyridine, 6-(p-chloroacetyl- ethylanilino-methyl)-5-(p-chlorophenyl)-2,4-diamino pyridine, 6-(p-chlorophenylbutylanilino-methyl)-5-(p-chlorophenyl)-2,4-diamino pyridine, p-(2,6-diamino-1,2-dihydro-2, 2-dimethyl- S-triazin-1-yl) phenylpropionyl sulfanilyl fluoride or variants of the propionamide bridge of acrylamido, N-ethylsulfonamido, N-ethylcaboxamido, oxyacetamido, or oxythyl oxy; or which inhibits purine or pyrimidine synthesis such as xylosyladenine, 6-azauridine, 5-aminouridine, 5-azaorotic acid; or which inhibits nucleotide interconversion such as hadacidin, 6-mercaptapurine, azathioprine, nitro-dUMP, psicofuranine, decoyinine, 5-fluorouracil, 5-fluorodeoxyuridine, shadowmycin; or which inhibits nucleotide utilization such as cytosine arabinoside, arabinosyladenine; or which becomes incorporated into polynucleotides such as 8-azaguanine, tubercidine, toyocamycin, sangivamycin, formycin, 7-deazainosine, 8-azainosine, or 7-thia-7, 9-dideazainosine; or which is a glyoxalase inhibitor such as Glyo-I, or Glyo-II,

an agent which blocks synthesis of prostaglandin A₂ which effects platelett aggregation such as salicylic acid, pyrogallol, 5,8,11,14-eicosatetraynoic acid, [□□]g -naphthol, guaiacol, propylgallate, nordihydroguaiaretic acid, N-0164, benzydamine, 9,11-azoprost-5, 13-dienoic acid, 2-isopropyl-3-nicotinylindole,

an agent which blocks prostaglandin synthetase such as indomethacin, sulindac, tolmetin, mefenamic acid, ibuprofen, naprozen, fenoprofen, fluribiprofen, ketoprofen, meclofenamic acid,

flufenamic acid, niflumic acid, benzydamine, oxyphenbutazone, aspirin, acetaminophen, salicylamide, O-carboxydiphenylamine, tolectin, diclofenac, 2,7-dihydroxynaphthalene, 5-(4-chlorobenzoyl)-1-methylpyrrole-2-acetic acid, 5-(4-methylbenzoyl)-1,4-dimethylpyrrole-2-acetic acid, 5-(4-chlorobenzoyl)-1,4-dimethylpyrrole-2-acetic acid, 5-(4-fluorobenzoyl)-1,4-dimethylpyrrole-2-acetic acid, 5-(4-chlorobenzoyl)-1,4-dimethylpyrrole-2-(2-propionic acid), 5,6-dehydroarachidonate, 11,12-dehydroarachidonate, or 5,8,11,14-eicosatetraynoate; or of an agent which blocks lipoxygenase or blocks leukotriene action such as BW755C, FPL 55712, or U-60,257,

an antiarrhythmic agent such as procainamide or quinidine,

an inhibitor of hepatic synthesis of Vitamin K dependent clotting factors such as warfarin sodium, dicumarol, 4-hydroxycoumarin, phenprocoumon, or acenocoumarol,

an agent which relaxes vascular smooth muscle such as hydralazine, minoxidil, or isosuprine,

$\text{Na}^+ \text{K}^+$ -ATPase inhibitor such as digitoxigenin, digoxigenin, cymarol, periplogenin, or strophanthidiol, or ouabain glycosides, cardenolides, or basic esters, or ICI-63,632, ICI-63,605, ICI-62,655, ICI-62,838, ICI-69,654, ICI-58,622, ICI-61,374, ICI-57,267, ICI-61,424, ICI-61,411, ICI-65,199, ICI-70,898, ICI-70,899, ICI-70,900, ICI-70,901, ICI-62,966, ICI-65,210, ICI-63,116, ICI-62,936, ICI-65,551, ICI-63,978, ICI-62,276, ICI-63,056, ICI-67,135, ICI-67,167, ICI-67,134, ICI-67,875, ICI-67,880, or ICI-61,558,

a calcium channel blocker such as prenylamine, verapamil, fendiline, gallopamil, cinnarizine, tiapamil, diltiazem, bencyclan, or nifedipine; or an agent which stabilizes calcium binding to cellular calcium stores and thereby inhibits the release of this calcium by contractile stimuli such as 8-(N,N-diethylamino)-octyl 3,4,5-trimethoxybenzoate (TMB-8),

a monoamine oxidase inhibitor such as tranlylcypromine, phenylethylamine, trans-cinnamic acid, phenelzine, or isocarboxazid,

a benzodiazepine compound such as clorazepate,

valproic acid,

an agent which causes repression of the synthesis of HMG-CoA reductase such as 20-[[\square]] α -hydroxycholesterol, 22-ketocholesterol, 22-[[\square]] α -hydroxycholesterol, 25-hydroxycholesterol, 22-[[\square]] α -hydroxycholesterol, 7-[[\square]] α -hydroxycholesterol, 7-[[\square]] α -hydroxycholesterol, 7-ketocholesterol, or kryptogenin; or of an agent which inhibits HMG-CoA reductase such as lorelco; or of an agent which inhibits lipolysis such as 5-methylpyrazole -3-carboxylic acid (U-19425), nicotinic acid, uridine, inosine, 3,5-dimethylisoxazole (U-21221), 3,5-dimethylpyrazole, prostaglandin E_2 , eritadenine, or eritadenine isoamyl ester; or of an agent which inhibits lipogenesis such as ascofuranone, (-)-hydroxycitrate, or tetrolyl-CoA; or of an agent which is hypocholesterolemic such as lentysine; or of an agent which lowers triglycerides

such as lipid; or of an agent which is an inhibitor of acetyl-CoA carboxylase during lipogenesis such as 2-methyl -2-p-(1,2,3,4-tetrahydro-1-naphthyl)-phenoxy-propionate (SU13437), 2-(p-chlorophenoxy)-2-methylpropionate, kynurenate, xanthurenate, kynurenine, 3-hydroxyanthranilate, or 2-methyl-2-p-(p-chlorophenyl)phenoxypropionate; or of an agent which is an inhibitor of hepatic β -lipoprotein production such as orotic acid,

a vasodilator such as WS-1228A, or WS-1228B; or of an anti-inflammatory agent such as amicomacin A,

a protease inhibitor such as leupeptin; or which is an inhibitor of pepsin such as a pepstatin, a pepstanone, or a hydroxyepstatin,

an inhibitor of cell surface enzymes such as bestatin, amastatin, forphenicine, ebelactone, or forphenicin,

a phosphodiesterase inhibitor such as theophyllineacetic acid, theophylline, dyphylline, disodium cromoglycate, 6-n-butyl-2,8-dicarboxy-4,10-dioxo-1,4,7,10-tetrahydro-1,7-phenanthrolin, 2-chloroadenosine, dipyrindamole, EG 626, AY-17,605, AY-17,611, AY-22,252, AY-22,241, cis-hinokiresinol, oxy-cis-hinokiresinol, tetrahydro-cis- hinokiresinol, trans-hinokiresinol, dehydrodicaffeic acid, 2,6,4'-trihydroxy-4-methoxybenzophenone, p-hydroxyphenyl crotonic acid, papaverine, 3-(5-tetrazolyl)-thioxanthone-10,10-dioxide, 3-carboxythioxanthone-10,10-dioxide, W-7, HA-558, MY-5445, OPC-3689, OPC-13135, or OPC-13013, reticulol, PDE-I, or PDE-II,

an inhibitor of tyrosine hydroxylase, the enzyme catalyzing the rate-limiting reaction in the biosynthesis of norepinephrine, such as azadopamine, isopropylazadopamine, dimethylazadopamine; triphenolic compounds such as n-propylgallate; diphenolic benzoic acid, 3,4-dihydroxybenzoic acid; phenylcarbonyl, 3,4-dihydroxybenzaldehyde, arterenone, or adrenalone H 22/54, 3-iodo-L-tyrosine, D,L-[\square] α -methyl-p-tyrosine, 1-3-iodo-[\square] α -methyltyrosine, 3-bromo-[\square] α -methyltyrosine, gentistic acid, 3-chloro-[\square] α -methyltyrosine, phenylalanine, 3,5-diiodo- L-tyrosine, 3,5-dibromo-L-tyrosine, 3-bromo-[\square] α -methyl-L-tyrosine, 3-fluoro-[\square] α -methyl-L-tyrosine, 3,4-dihydroxyphenylethylacetamide, 3,4-dihydroxyphenylisopropylacetamide, 3,4-dihydroxyphenylbutylacetamide, 3,4-dihydroxyphenylisobutylacetamide, D,L-[\square] α -methylphenylalanine, D,L-3-iodophenylalanine, D,L-4-iodophenylalanine, D,L-[\square] α -methyl-3-iodophenylalanine, D,L-a-methyl-3-bromophenylalanine, D,L-[\square] α -methyl-3-chlorophenylalanine, D,L-[\square] α -methyl-3-fluorophenylalanine, mimosine, mimosinamine, mimosinic acid, 7-O-methylspinochrome B, 6-(3-hydroxybutyl)-7-O-methylspinachrome B, aquayamycin, chrothiomycin, frenolicin, fuscic acid, pentylpicolinic acid, dopstatin, methylspinazarin, 6,7-dihydroxymethylspinazarin, 3-ethyl-[\square] α -methyltyrosine, 3-methyl-[\square] α -methyltyrosine, 3-isopropyl-x-methyltyrosine, 3-allyl-[\square] α -methyltyrosine, 3-4-hydroxy-3-(2-methylallyl)-phenyl-2-methylalanine, 3-3-(2,3-

epoxypropyl)-4-hydroxyphenyl-2-methylalanine, 3-isobutyl-[[\square]] α -methyltyrosine, 3-methylvinyl-[[\square]] α -methyltyrosine, 5-methyl-6,7-diphenyltetrahydropterin, 3-(2,3-dihydro-2,2-dimethyl-5-benzofuranyl-2-methylalanine, 3-2,3-dihydro-2,2-dimethyl-5-benzofuranyl-2-methylalanine, [[\square]] α -methyldopa, or ethyl-3-amino-4H-pyrrolo 3,4-isoxazole carboxylate, and proteins including enzymes and hormones such as insulin, erythropoietin, interleukin 2, interferon, growth hormone, atrial natriuretic factor, tissue plasminogen activator.

229. **(Currently Amended)** The method according to claim 1, wherein the phthalhydrazide ~~comprises at least one selected from the group consisting of~~ is selected from the group consisting of phthalimide, aminophthalic acid diester, aminophthalic acid dihydrazide, aminophthalic anhydride and phthalhydrazide protected by a hydrolyzable group.